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# USSR Report

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28 November 1984

USSR REPORT  
ENERGY

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## OIL AND GAS

### OIL MINISTRY NEGLECTS TOMSK INFRASTRUCTURE

Moscow PRAVDA in Russian 3 Jul 84 p 2

[Article by Sh. Asfandiyarov, Strezhevoyneft' Oil- and Gas-Extraction Administration foreman, N. Belous, gas and arc welder, Yu. Mal'tsev, operator, and E. Deymund, senior airport communications engineer: "Can It Be Done Without Tents?"; under the rubric: "From the Mail"]

[Text] Strezhevoy, Tomsk Oblast--Soon oil recovery levels in the Tomsk Oblast will increase considerably. But it will take the help of pilots to quickly put tens of new fields into operation, fields which are hundreds of kilometers from the Tomsk oil-workers' capital city, Strezhevoy, in conditions of taiga, bogs and tracklessness. In fact it is thanks to civil aviation pilots that shift-type and shift-field expeditionary methods of labor organization were used with such success for geologists, oil workers and construction workers.

Such is the essence of these methods: People live in a base city. But in order to work in the distant fields they fly in helicopters and airplanes for seven, 10, or 15 days. They live in boarding houses, the majority of which are equal in comfort to city apartments. So that here the airplane is just as normal a mode of transportation as, shall we say the Muscovite's Metro.

People also fly here from other republics. The airport serves approximately 1,200 passengers daily. But ask any shift worker the most difficult thing about his job. No doubt you will hear, "Sitting and waiting in the air terminal....Not sitting, nor eating nor drinking. And when the weather's bad, there's no place to sleep."

One's mood plummets, and work discipline and labor productivity are lowered. The very idea of the shift method, which saves millions of rubles in the development of a region, is discredited.

The temporary air terminal building in Strezhevoy is devoid of basic amenities for passengers as well as for airline employees. The antiquated equipment is unusable, nor can it serve large aircraft, although the takeoff and landing strip is ready for them. But construction on the air terminal and the air-traffic controller station, begun over five years ago, is dragging on unjustifiably.

In the Strezhevoyneft' Administration's Department of Capital Construction, which acts as purchaser, they explain this, first of all, by the fact that the Ministry of the Petroleum Industry allocates little in the way of capital investments. Last year, twenty times less than the needed two million rubles was released. And it's almost the same at present.

And mistakes made during the planning of the air terminal have had their effect, leading to an increase in costs. And there were other accounting errors.

The Strezhevoy aviators are now planning to open a Strezhevoy-Moscow route, one which we've long awaited. But where will tickets be registered? In the old air terminal there was no room for passengers. Is it possible they will have to set up tents, like they did when the city was first being built?

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## OIL AND GAS

### USSR OIL WORKERS' RESULTS REVIEWED

Moscow NEFTYANIK in Russian No 8, Aug 84 p 1

[Article: "Results of the First Half Year"]

[Text] Vital tasks have been set before oil industry workers by the state plan for the economic and social growth of the USSR for 1984. Minnefteprom [Ministry of the Petroleum Industry] must recover 603 million tons of oil and gas condensate, and 49 billion cubic meters of gas.

The greatest increases will come from Western Siberia, the Komi ASSR and Western Kazakhstan. In 1984, 28.3 million meters of footage will be drilled, and 9,230 million rubles in capital investments will be assimilated.

At the same time, it should be emphasized that during the 11th Five-Year Plan period the petroleum industry has been operating under considerably worsened mining and geological conditions when a great number of the fields are in late stages of development and recovery levels have decreased. In a word, at a stage when qualitatively new and more challenging tasks are being resolved.

Going over the results for industry enterprises for the first half of 1984, it must be said that the majority of the production associations are successfully coping with the plans and socialist obligations. They have recovered 1,234 thousand tons of oil and gas-condensate and 551.7 million cubic meters of gas, all above the plan.

The party's call to obtain a 1 percent above-plan increase in labor productivity and an additional 0.5 percent reduction in production costs met with broad response in the industry's labor collectives. Results of the work show that in the majority of regions these obligations are being met, and for the industry overall almost 800 industrial and production personnel were made available, and operating costs were reduced by 0.5 percent. The industry overfulfilled its gas recovery plan by 362 cubic meters. It should also be noted that during the period under review, within the industry there was an abrupt turnaround in all operations: development well drilling volume amounted to 12.7 million meters, 9 percent over the corresponding period for last year. Only in Glavtyumenneftegaz were 2,064 wells converted to mechanized production, which is a 1.2-fold increase over last year. The volume of geological and technical measures increased 1.3-fold.

As it has in former years, the Yuganskneftegaz Production Association collective, which initiated the All-Union Socialist Competition, is doing outstanding work. Good results have been obtained by field personnel of the Tatneft', Bashneft', Kuybyshevneft', Krasnoleninskneftegaz, Turkmenneft', Mangyshlakneft', Grozneft' and other associations.

At the same time Minnefteprom underfulfilled the plan by 1.5 million tons of oil with gas condensate for the period January-June. Collectives of the Azneft' and Gruzneft' associations are behind in their work levels. But Glavtyumenneftegaz permitted the principal lag, to the tune of 2.24 million tons, although the Tyumen Oblast fields persevered, passing the million mark for daily oil recovery.

On the first of July of this year in the city of Surgut, a regional meeting of oil and gas recovery, and underground and major repair foremen was held at which the present state of affairs was analyzed and the main tasks for upcoming work were determined in the light of CPSU Central Committee decisions which were connected with increasing reserves of oil and oil products. An appeal to all brigades in leading industry professions to fulfill their assignments ahead of schedule for 1984 and the 11th Five-Year Plan period on the whole was also adopted.

In the present circumstance, what is more important than ever are organization and discipline, as is the attunement to his work of every worker on every brigade, every field, and every collective, toward resolving the tasks which have been set.

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## OIL AND GAS

### UDMURT OIL PRODUCTION FIGURES CITED

Moscow NEFTYANIK in Russian No 8, Aug 84 pp 2-5

[Article by Udmurtneft' Association General Director V. I Kudinov: "The Dynamic Growth of Production"]

[Excerpts] For the past three-plus years of the 11th Five-Year Plan period, substantial qualitative changes have occurred in the development of the Udmurtia oil industry.

Fulfilling the decisions of the 26th CPSU Congress, the collectives of the association's enterprises have been directing their efforts primarily toward realizing vigorous growth rates for oil recovery and drilling operation volumes. At the same time there has been implemented a broad program of operations designed to increase new oil recovery capacities, to improve field development and methods of administrating production and work with the labor force. This has brought about dynamic growth in production and has improved all the primary technical and economic indicators.

Since the five-year plan period began, 94,000 tons of above-plan oil have been recovered, three new fields and 817 new wells have been developed and R258 million in capital investments have been used in development and the technical re-equipping of production. The collectives of the association's enterprises also successfully concluded 1983. Above-plan oil recovery amounted to 63,200 tons versus socialist obligations of 40,000 tons and 2.1 million cubic meters of gas, and 56 new wells were put into operation in addition to the plan. Of all the oil produced, 96.9 percent fell into 1st and 2nd class quality groupings. Marketable products amounting to R2.191 million above the plan were sold, R898,000 worth as a result of the improved quality of the products. The proportion of labor input for maintenance per well was lowered for the year by 10.1 percent versus a planned figure of 8.6 percent.

All four oil and gas extraction associations met the plan quota for recovery. The Udmurtneft' Association was presented the Red Banner Order for all quarters of 1983 by Minnefteprom and the Central Committee for the Trade Union of Oil and Gas Industry Workers.

The successful efforts of the Udmurtia oil workers was brought about by the incorporation of organizational and technical measures and the widespread growth of socialist competition. The party, Komsomol, trade-union and economic agencies of the association have conducted massive organizing and political-education work in the labor collectives. The competitors' primary attention was focused on maximal utilization of internal resources and increasing the efficiency of production, and especially of such [of its] indicators as keeping the well stock and equipment operable, reducing losses of work-time and economising on material and labor expenditures.

The condition of the well stock improved in 1983. The coefficient of operation for active wells came to 0.948 versus 0.946 in 1982. Inoperative well stocks amounted to 1.4 percent at year's end, the standard being 1.9 percent.

The inter-service period for operation of wells equipped with ETsN units [Submersible electric centrifugal oil recovery pump unit] increased from 340 to 361 days, and for wells equipped with ShGN units [sucker rod pumps], from 240 to 252 days. The significant work in realizing geological and technical measures was a major factor in fulfilling the plan assignments and socialist obligations for oil recovery. Thanks to the incorporation of these measures, 501,700 tons of oil were recovered. Much attention was given to utilization of the achievements of science and technology. During three years of the five-year plan period 198 measures using new techniques were incorporated, and as a result an economic impact of 8.8 million rubles was realized and 159 workers were made conditionally available.

Also, efforts are being made in the association to sequentially and systematically develop and perfect the brigade form of organization and stimulation of labor.

An integrated schedule of measures for 1981-1985 has been developed and is being laid out to all enterprises and production units. Shops and sections to be switched over to the brigade form of labor organization were determined locally. The association's standardizing and research station has developed and brought all the necessary procedural data and practical recommendations to each enterprise. Enterprise supervisors are in charge of efforts to introduce and perfect the brigade form of labor organization. They have had talks with workers on the significance and advantages of the brigade form, on the role of the foreman and the brigade leader, on the rules and responsibility of the brigade and each of its members and on the significance of the coefficient of labor participation [KTU] in determining wages.

In 1980 we had 432 brigades working, and of them 207 were in basic production and 225 in auxiliary services. From 1981 to 1983, 104 new brigades were organized. Those working by the brigade form of labor organization comprised 73.3 percent. Brigades working by unified job authorizations number 221.

The KTU, in use in 272 brigades, has become an important economic lever in the hands of the brigades, making possible increased labor activity and production discipline. The oil recovery brigade councils of G. Ya. Khusainov (Izhevsk NGDU) [Oil- and Gas-Extracting Administration], V. D. Shkalikov (Botkin NGDU)



and I. S. Yemel'yanov (Igra NGDU) accumulated excellent experience in determining the quantum of KTU. The foremen here keep daily accounts, according to various indicators, of the work of each brigade member and the brigade councils determine the quantum of KTU for each worker thoroughly and objectively.

Perfection of the brigade form of labor organization in oil-recovery brigades has been carried out simultaneously with the piece-rate wage system for oil and gas operators. This system has allowed a considerable increase in oil-recovery operators' economic incentive in fulfilling and overfulfilling the plan for qualitative maintenance of their assigned well stock with worker strength less than the norm.

The Komsomol-Youth Oil-Recovery Brigade of the Igra NGDU, headed up by the young specialist-foreman I. S. Yemel'yanov, is working under the motto "Maximum Oil From Each Well". In 1983 this brigade recovered 4,940 above-plan tons of oil. The yearly plan for oil recovery was fulfilled on 28 December 1983, and the plan for three years of the five-year plan period was fulfilled by 23 December of the same year. The interservice period for wells equipped with ETsN units amounted here to 510.5 days against the plan figure of 347 days, and ShGN-equipped wells went 224 days between service operations, the plan norm being 220 days. The coefficient of operation was raised to 0.948 against 0.947 for the NGDU average. The brigade consists of 11 persons and services 88 wells, 10 AGZU's [possibly gas-metering installations] and 1 DNS [remote pumping station]. Proportionate worker strength was brought to 0.125, the plan strength being 0.147.

The method of mutual checking has been introduced in the brigade; that is, the operators exchange service routes, making better detection of faults possible. A great amount of attention is being paid to production efficiency, the quality of well servicing and labor discipline. The title "Best Brigade in the Ministry of the Petroleum Industry" was also won by this collective in 1983 for its work totals.

During 1982-1983 in oil-extracting administrations of the association, the system of organizing labor and wages without job authorizations was introduced and perfected in well-servicing brigades along the lines of the Bashneft' Association experience. A Statute has been developed for the organization of labor and economic incentive for PRS [well-servicing] brigades working by the system of no job authorizations, taking into account local special features. Seven PRS brigades were changed over to the new system as an experiment. The highest indicators were achieved by those brigades where the system of operating without work orders was combined with the perfection of the brigade form of labor organization. Among them can be named the collective from the Igra NGDU, headed by Foreman Yu. A. Shklyayev.

In 1984, all PRS brigades will be put on the system of operating without work orders.

Our drilling personnel played a major role in fulfilling the plan for oil recovery. In 1983, when the plan was set for 307 wells, 313 wells were sunk.

All the basic technical and economic indicators were improved. Thus, compared to 1982 the average amount of footage drilled per brigade increased by 1,218 meters, the length of construction cycles for wells was shortened, the commercial speed increased by 115 meters per rig in a month and the cost per meter drilled was reduced by 4.35 rubles.

The introduction of PPG-170 and PGP-170 packers into wells with catastrophic losses of prewash fluid reduced the time needed to eliminate the problem, thereby markedly lowering material outlays.

In 1983 the contract brigade method of rigging up wells found wide practical application in the association. In the course of the year, 18 out of 20 brigades were converted to contract brigades, including all the rig-building and well completion brigades. During the year, 60 percent of the total volume of drilling operations was completed via the contract brigade method, which was also used for rigging up 113 wells. A major engineering support effort preceded brigade conversion. Quotas for outlays of materials, tools and spare parts were developed, and time norms were expanded for rigging-up operations, drilling and well completion.

Use of the all-round brigade work order system for rigging up wells increased the responsibility of all related brigades, and also that of the central and regional technological engineering services, production maintenance bases, engineering and technical employees from the drilling enterprises system for timely provision of materials and equipment for jobs, strict observation of engineering discipline and organization of production. Here, too, the material incentives envisaged in the contract brigade system played an appreciable role.

This first experiment in organizing well rigging-up operations by the contract brigade system has already confirmed its obvious merits. Thus, the Izhevsk Drilling Operations Administration fulfilled the plan for footage drilled by 100.1 percent, for drilling speed by 102.8 percent and for labor productivity by 107.9 percent. The production cost per meter drilled was lowered by 4.4 percent against the plan. Time expended in construction of a single well was shortened by 10 days, bringing it down to 27.9 days. Considerable savings were obtained by lowering the cost of completed operations: in drilling, the savings amounted to R265,000 and R191,300 in rigging-up operations. Bonuses totaling R27,300, were awarded for the reduction of estimated costs on assigned projects by workers on drilling, rigging-up and field test brigades, and also by the engineering and technical workers who so actively contributed to the growth of the contract brigade system.

The introduction of the brigade forms of organization of labor and drilling contract brigades has had a positive effect on the state of labor and production discipline.

If we take into consideration that 250 wells per year on the average are put into operation, then we can figure that it was only the reduction in the well construction and start-up stage during the 1983 effort which produced the additional 6,105 tons of oil.

The measures taken have improved labor discipline and cut down turnover. In 1983 loss of work time caused by absences was cut by 33 percent, and loss of work time due to administrative leave cut by one-third. Employee turnover has decreased at 22 out of 32 enterprises.

In 1984 our oil-workers took it upon themselves to recover 9.21 million tons of oil, including 40,000 tons over the state plan, to bring in 20 new wells in addition to the plan, to reduce the cost of drilling operations by R211,000 and to save 2.66 million kilowatt-hours of electric power. Upcoming efforts include putting two new oil fields, the Begeshkin and the Kyrykmas, into operation, drilling 470,000 meters, putting 400 new wells into operation and beginning parametric drilling for the first time in the northwestern part of the republic. A large volume of preparatory work will be completed in constructing facilities for a new field on the left bank of the Kama and a number of other fields. It is going to take the use of more than R40 million in capital investments to bring about this program in a year. A series of measures have been outlined to realize a plan for social development in the collective and a supply program. Construction plans for 1984 include 31,700 square meters of living space and a 320-place kindergarten, and construction will begin on a 250-patient clinic, a 600-head hog farm and a 100-head cattle shed.

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## OIL AND GAS

### OFFSHORE DRILLING IN BALTIC SEA

Moscow IZVESTIYA in Russian 15 Apr 84 p 3

[Interview with S.I. Yudin, chief of Glavmorneftegazprom, USSR Ministry of the Gas Industry, by IZVESTIYA correspondent A. Blokhin: "What Will the Offshore Shelf Yield?"; date and place not specified]

[Text] A new phase has begun in development of the natural resources of the Baltic Sea. The oil workers of the Kalinin-grad Association for Offshore Oil and Gas Exploration have begun drilling the first test well on the offshore shelf from a stationary platform.

IZVESTIYA correspondent A. Blokhin requested that S.I. Yudin, chief of Glavmorneftegazprom, USSR Ministry of the Gas Industry, comment on this report and also to tell what development of the oil and gas fields on the continental shelf and other regions of the country will provide for us and about the prospects for development of the new sector of the economy.

Development of the offshore shelf in the Baltic is proceeding within the framework of a trilateral international agreement, concluded between the Soviet Union, the Polish Peoples Republic and the German Democratic Republic. A joint enterprise--Petrobaltik--has been created on an equivalent basis.

Integration of the efforts of these countries is yet another example of the mutually advantageous cooperation within CEMA. The conditions of the agreement provide a form of distribution of the produced fuel from newly discovered offshore fields, which will stimulate the operations in the best manner without giving preference to development of the shelf adjacent to any one of the countries.

[Question] What forces the oil and gas producers to go to sea, where the expenditures of labor and funds for each ton of oil and for each cubic meter of gas are 5-10-fold greater than on land? After all, Western Siberia now has other, as is said, unlimited oil- and gas-bearing regions.

[Answer] Today yes, but what about tomorrow? The vigorous increase of energy consumption and the tendency projected during the 1960s toward depletion of oil reserves on land aroused a sharp impetus throughout the world toward

development of oil and gas resources of the continental shelf. More than 120 countries are working in this direction. Thirty of them are producing oil and gas at sea. According to the forecasts of economists, almost half the oil produced by foreign companies will be offshore by 1990.

The Soviet Union has the world's largest shelf. True, the greater part of the shelf includes the northern and far eastern seas with a severe hydrometeorological situation.

[Question] Where are our offshore oil and gas workers now operating?

[Answer] The pioneer in development of offshore oil fields in our country and in the world is Azerbaijan. The Caspian now yields two-thirds of the oil and more than 90 percent of the gas produced in Azerbaijan. An entire flotilla of floating drilling rigs of various types is now operating in the open sea. The latest Soviet technical innovation is the semisubmerged rig "Shel'f"—a giant structure with a 58-meter derrick. This is an entire enterprise with complicated equipment, hoisting mechanisms, precision instruments and electronic hardware.

A considerable advance in development of offshore fields is also construction of deepwater stationary platforms, from which entire "clusters" of operating wells will be drilled.

Gas production from the Golitsyn field in the Black Sea was begun recently. The blue fuel is transported over a 73-kilometer underwater gas line to the Crimea. Large production subdivisions--production associations and trusts--have been created for operation on the shelf of other seas. Of course, the scales and rates of operations are not identical everywhere. Main efforts are concentrated in those basins where the greatest effect can be achieved within a relatively short time.

Several offshore fields, including the "28th of April" oil field, not far from the well-known Neftyanyye Kamni fields in the Caspian, were discovered during the last few years. The Chayvo and Odoptu fields have been explored on the shelf of Sakhalin Island, while oil pool D-6 has been discovered in the Baltic Sea.

Geophysical ships and drilling platforms that are not inferior in their characteristics to the best foreign models have now been constructed and equipped. The installation platform of the All-Union Industrial Association for Offshore Oil and Gas Exploration in the Caspian Sea, where gigantic supports of steel pipe almost 1.5 meters in diameter are assembled, has been operating for several years now. Incidentally, they are very similar externally to the gigantic dimensions of an electric power transmission pole. Except they are not installed on land. Resting on the sea bottom, they support the drilling platform the size of a football field above a 100-meter layer of water. Two drilling rigs, installed on this base, can drill 20 oil wells.

The unusual marine masts are assembled on a special building berth near the very edge of shore. After all, it is difficult to lower such a bulky and cumbersome object into the water: it weighs up to 10,000 tons!

The first unit of a specialized deepwater offshore foundations plant was put into operation quite recently in a suburb of Baku--Karadag. Supports for several deepwater foundations will be assembled annually on five of its building berths.

Divers are now conquering great depths. The hardware and technique of long-submergence deep diving (up to 20-30 days) at great pressure has been organized at the Arctic Ocean Oil Exploration Trust. The divers of this trust have carried out repair operations in the Barents Sea near the base of the well at a depth of 245 meters for the first time in our country.

Each downward step requires study of a combination of multifaceted problems and scientific, engineering, medical and physiological research. Creation of a hyperbaric center at Leningrad has been provided for these very purposes. Its task is to find reliable and safe methods for man to work under water at a depth up to several hundred meters.

Study and development of offshore fields are being carried out according to a specific integrated program, in implementation of which 150 organizations of 22 ministries and departments are participating.

[Question] Stanislav Ivanovich, how can development of our shelf be accelerated?

[Answer] One can answer this question both briefly and expansively. Specific assignments have been defined to many ministries by government decree and deadlines for delivery of various types of hardware have been named. Unfortunately, manufacture of some types of equipment that we need is being delayed. The offshore oil and gas workers have been waiting for a long time for the more powerful Bu-6500 drilling rig, which will permit confident drilling of wells 6.5 kilometers deep.

Drilling ships are being used in our country for the first time. The main complexity in control of them is to provide stable positioning of the ship at the drilling point without anchors or any other mechanical attachments. Automated dynamic positioning systems with computers are used on these vessels. But, despite the electronics, there should always be an operator in readiness who continuously monitors the operation of his electronic duplicate: the price for the slightest failure may be too expensive.

Therefore, prevoyage preparation of the crews requires a training period in special simulators, which we do not yet have.

[Question] I had occasion to visit the Caspian oil workers. Once, when our launch was ready to tie up to the drilling platform, I saw that something was diving and swimming near the steel girders going into the depths. It seemed to be a seal. I recall that for me this fact became good evidence that the water near the drilling rig is clean. How is this achieved?

[Answer] The Caspian oil workers have done much to maintain the cleanliness of this unique basin, where schools of salmon and marine animals of valuable species are found. The Azerbaijan specialists have created, tested under field conditions and introduced a rig that utilizes water in a closed cycle. And the wastes that occur during drilling and in "plugging" the oil wells are collected and transported to shore.

This is of course only one aspect of this enormous operation which is being carried out for environmental protection. We understand well that the sea is not only a promising fuel storehouse, but also a deep arable land from which people of many countries can gather the harvest.

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## OIL AND GAS

### SOVIET-ITALIAN COOPERATION IN OFFSHORE DRILLING

Moscow IZVESTIYA in Russian 18 Apr 84 p 6

[Article by V. Shmyganovskiy: "Offshore Shelf-84"]

[Text] The first Soviet-Italian symposium on development of the oil and gas resources of the continental shelf was held at the All-Union Association Sovintsentr.

More than 20 Soviet ministries and departments together with Italian government concerns ENI and IRI conducted it under the aegis of the USSR GKNT [State Committee for Science and Technology].

"The cooperation of our two countries in this field is developing rather successfully," said the deputy minister of the USSR Gas Ministry S. R. Derezhov. "Italian companies have delivered to us 4.3 million tons of large-diameter pipe and equipment for the compressor stations of the Urengoy-Pomary-Uzhgorod gas pipeline. In turn, approximately 54 billion cubic meters of gas have been delivered to Italy since 1974. Contracts provide for delivery of it up to the year 2000."

Main attention was devoted at the symposium to problems of exploitation of fields in severe climatic regions. Worldwide practice is not yet able to offer solutions that satisfy the conditions of the shelf of the USSR's arctic seas. The experience of Italian specialists may be useful: many of their developments take into account the arctic version. These are development of offshore platforms and underwater pipelines at great depths.

"The USSR has the world's largest continental shelf," noted S. R. Derezhov, "and a large part of it is promising with respect to oil and gas. Development of the shelf is a complicated, difficult and expensive program, which can be compared on its scale to the problem of the development of space."

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## OIL AND GAS

### OFFSHORE DRILLING IN CASPIAN SEA

Baku BAKINSKIY RABOCHIY in Russian 17 May 84 p 1

[Article by A. Gol'denberg: "The Steel Islands are Moving Further and Further Into the Sea Toward the Caspian Riches"]

[Text] The yellow bulk of the cranes, seemingly clasping hands with the open work booms, formed an improvised marquee above the giant assembled steel section reposing on the installation platform near the very edge of the sea. It seemed only that there was no force which could move this enormous bulk weighing 2,800 tons from its spot. But the loudspeakers issue the command: "Begin!" The winches that unwind heavy steel cables, slowly begin to grind and the support unit of the steel island slowly, almost imperceptibly, begins to creep over special tracks toward the water.

The sea washed this spot quite recently, but now our country's first deepwater platforms, with which the drillers of the offshore interior are moving in giant steps toward the oil resources of the Caspian, are being born on the land won from the water.

Instructions to the winch operators, who are holding the steel giant on cables, and to the brigade leaders working near the lowering tracks, along which slowly, now and then stopping as if to rest, the block moves and to the observation stations near the boundary of the earth and sea are carried from the central dispatcher's station, where chief engineer of SMU-4 [construction and installation administration] of the Trust for Offshore Oil and Gas Exploration in the Caspian Sea, Ayaz Manedovich Salamanly, is located.

The cumbersome structure should be lowered into the sea slowly and smoothly. To prevent the possibility of the metal impacting the shallow bottom in this region, experienced divers Yu. Loparev and I. Shibalov move metal pontoons under the frame. Then, when the entire unit is in the water, there is no need for them and the pontoons are removed. The future island will be towed afloat to its destination.

The collective of SMU-4 has worked well in construction of this complicated hydroengineering facility. The second unit of the Caspian's largest platform was assembled 10 days faster than the first unit. Installer divers Ye. Bokov, Yu. Usikov and A. Zheleznyy faultlessly assembled the structures of steel

pipe, the diameter of which reached almost 1.5 meters. Working at 40-meter height, they demonstrated high labor productivity. The welders of B. Pilyuga's brigade turned over all joints upon first presentation and molten seam foreman A. Abdullayev and other workers of the "sweat shop" displayed high labor quality.

SMU-4 was our country's first to take on itself the entire combination of operations to construct the metal islands and to install them at the drilling site, having provided a high level of industrialization of all operations. Not only an island is now being born on shore, but the "beginning" of its frame module for drilling, pumping and other equipment is being implemented. All this was previously done at sea, which required the expenditure of considerably more time. The three-story building with helicopter pad on the roof, in which the drillers of the interior will live and in which are located a dining room, dispensary, recreation lounge and radio station, is assembled on shore.

From the installation platform, where lowering of the unit has been going on for 2 days now, an entire flotilla of ships, drifting close to shore, can be seen. The nimble diving launches and seagoing tugs, the country's most powerful floating crane Azerbaijan and other specialized vessels are ready to participate in transport and installation of the island at the field imeni 28 April.

"The new hydroengineering installation," says the chief engineer of the project I. F. Smagin, "to which tens of artificial islands in the Caspian Sea are indebted, is assembled on a section of sea where the depth of the water reaches 111 meters. Stationary platforms are no longer suitable at these depths. Naturally, the designers had to adopt measures to reinforce the structure to increase its stability. The diameter and thickness of the pipe walls from which the base is assembled, specifically, were increased. Its 'feet' are driven considerably deeper into the sea bottom than was required previously. The first deepwater platform, installed at the field imeni 28 April, is distinguished by the fact that 24 wells can be drilled from it, which is twice as many as planned from its predecessor. And this means that drilling them will be considerably less expensive. Two brigades will conduct drilling simultaneously by using two rigs that can be moved along the deck. This will considerably accelerate the work."

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## OIL AND GAS

### AZERBAIJAN OIL PRODUCTION

Baku VYSHKA in Russian 30 May 84 p 2

[Article by D. Valovoy and L. Tairov, special PRAVDA correspondents: "Not By Oil Alone"]

[Excerpts] Are they really still producing oil at Baku?"

"I never thought that Azerbaijan would live by oil alone!"

We had occasion to hear these expressions of amazement, directly opposite in their concepts, last fall in Rome at the traditional festival of UNITA--the newspaper of the Italian Communist Party--about Azerbaijan, to which an exhibition in one of the pavilions was devoted.

We later ascertained that not only foreigners are making similar "discoveries." And it is small wonder: the former tsarist domains made a running start after the October Revolution. The plants and factories of the same Azerbaijan have been producing products for 5 months now, equal in volume to the entire industrial production of Russia in 1913.

To passersby it seems that the pumping jacks rise and fall without rest, and they have been pumping the oil of Apsheron for decades, like steel hearts. If the drill rigs could speak, they would greet those who wash their tired faces within minutes of discovery of new fuel sources and to those who day and night, in warm and cold, check to see that the warm pulse of the ancient earth has not been stilled. It is because of their efforts and experience that the republic's interior now produces more than 17.5 million tons of oil and gas condensate annually. On European scales, this figure is impressive--after all, only 60,000 tons of this fuel is produced annually in Italy itself.

No, the storehouses of the Apsheron Peninsula have not been exhausted. The drillers of skilled foreman Fazil' Mamedov, who discovered the new Tarsadalyar oil field in the west of the republic, rejoiced literally in front of our eyes. The abundant gusher came from a depth of less than 3,000 meters.

The paths in the fields, which are 100 years old, did not grow vigorously. They did not rush to cover their tools when the vigorous pulse of the wells

finally began to weaken at the first Soviet oil field at Leninneft, where the oil brigade of Musa Bayramov is working. The oil field workers, if one can talk in the language of physicians, began artificial respiration on the oil-bearing beds, by using intrabed combustion. Is it not surprising? Fire, the ancient enemy of oil, began to help people extract it to the surface.

And what do the oil workers see for tomorrow? It is very interesting. A 15-kilometer well is being drilled in the region of Saatly at the decision of the International Geophysical Union. The goal is to determine what is hidden there upon approach to the mantle. Is there oil in addition to everything else? Drilling the Saatly well is of important significance. The drilling equipment, technique and technology and also the method of geological and geophysical research are being improved here. The research at Saatly is being conducted by more than 20 All-Union and republic scientific collectives, while the Azerbaijan NIPI [scientific research and planning institute] of the Petroleum Industry is directing and coordinating their activity. In its scientific and national economic significance, the information gained from the interior is not inferior to space data. The deep drilling rig is already providing these data.

But offshore rather than land fields still determine the glory of Azerbaijan oil. Up to 70 percent of all liquid fuel and up to 90 percent of the gas of the republic is now produced from under the waves of the gray Caspian. Seven gushers were recently drilled in the new field--the field imeni 28 April (this is the day that Soviet power was established in Azerbaijan). They produce 3,000 tons of oil within 24 hours. A special offshore test drilling administration, which has powerful floating rigs at its disposal, has been created to prospect for underwater resources. The first unit of the deepwater foundations plant has become operational--the foundations can be installed at depth up to 200 meters.

The capital of the Caspian fields is called a "city on pilings"--Neftyanyye Kamni. Among its founders are scientist and remarkable craftsman Mikhail Pavlovich Kverochkin Kurban Abbasov. He set out more than 30 years ago with a group of daring spirits near the threatening moss-covered cliffs rising above the waves, approximately 100 kilometers from shore, and drilled the first well here. The entire Kasporneftegazprom Association is now under the supervision of Kurban. And he has taken as his deputy Akif Dzhaferov--the supervisor of Azerbaijan's first brigade of communist labor, which has accomplished much for the glory of Neftyanyye Kamni. Giant supports of steel pipe almost 1.5 meter in diameter are now being assembled on the installation site of the association. Resting on the ocean bottom, they will support a drilling platform the size of a football field on a 100-meter layer of water. Two drilling rigs installed on this base are capable of drilling 20 oil wells. The oil workers of the republic have their first task--to stabilize production and to repay their former debt.

We were interested in a conversation with the Caspian oil workers: what are they doing to maintain the cleanliness of this unique basin? After all, schools of salmon and rare marine animals inhabit this region. It turned out that there is no cause for alarm at the fate of the sea. The oil workers have

at their disposal rigs that utilize water in a closed cycle. And the wastes that occur during drilling and in flushing the "plugs" in the wells are collected and transported to shore.

Vladimir Mayakovskiy once wrote:

If you firmly believe in the future--  
This is because  
The black thick blood of Baku  
Flows to the edges of the capitals.

The contribution of Azerbaijan is now very modest in the total oil reservoir of the country. But the republic is supplementing this with something else. Through skills, experience and technique. One of the first discoverers of the Siberian fuel storehouse was Baku resident Farman Salmanov. Many other Apsheron craftsmen have assaulted and are assaulting the interiors of Tyumen and the Far East, the Ukraine and Turkmeniya, Kazakhstan and Georgia. The oil fields in the Volga area were at one time called at second Baku.

But what well can get along without the pipe of Sumgait and without the field equipment manufactured at Baku? Pumping jacks, gusher fittings, preventors, submersible pumps, rods, swivels, rotors, repair units, well-flushing units, drill string haulers, slide valves come from this point. Nowhere else in the country is so much of this equipment produced. The scientists of the republic help the country's oil workers in exploitation of fields, in petrochemical processes, in problems of oil and gas field geology, geophysics and deep drilling. You perhaps cannot find a single oil-producing corner of the Soviet Union where the graduates of the Institute of Oil and Chemistry imeni M. Azizbekov and the numerous schools and vocational technical schools of Azerbaijan have not worked.

The oil produced in Azerbaijan comprises only approximately 8 percent in the annual volume of the republic's industrial production. And what else supplements the industrial baggage of the republic? One must enumerate 100 sectors. Besides petroleum products and petroleum equipment, Azerbaijan has become the largest producer of steel pipes, nonferrous metals, synthetic rubber, electric motors, construction materials, automobile tires, mineral fertilizers, air conditioners, porcelain and ceramic articles and rugs. A total of 350 types of products is exported to 80 countries of the world. Eightfold more electric power is now generated in the republic than during all Russia in 1913. Construction of a nuclear power plant has begun.

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## OIL AND GAS

### NEW UNIT FOR MUBAREK GAS REFINING PLANT

Tashkent PRAVDA VOSTOKA in Russian 25 Apr 84 p 1

[Article by K. Sabirov, Special PRAVDA VOSTOKA correspondent, Kashkadarya Oblast: "New Gas Purification Unit"]

[Text] The Mubarek Gas Refining Plant annually purifies and sends to customers millions of cubic meters of "blue fuel." Three units of the plant are now functioning. Construction of a fourth unit is proceeding at accelerated rates.

Construction of an additional production unit is approaching completion. The builders and installers are passing the worker's baton to the operators. This is what chief engineer of the plant Nikolay Viktorovich Budziyevskiy says on this account.

"The production units of all three assemblies require shutdown from time to time for repair and preventive and routine maintenance. The capacity of the plant will not increase with introduction of the new unit into operation, but another, no less important problem will be solved: it will be possible to shut down temporarily any one of the operating units and to carry out preventive maintenance without reducing the volume of refined gas.

"The additional unit, the estimated cost of which is 2.4 million rubles, was constructed by Bulgarian and Soviet specialists. Builders of the Mubarek Trust for Industrial Construction of Gas-Related Enterprises and the installers of Administration No 9 of Minneftegozstroy [Ministry of Construction for Petroleum and Gas Industry Enterprises] participated on the Soviet side. The equipment for the new unit was delivered by many plants from all directions of the Soviet Union.

The two production runs, combined into a standby unit, will be able to refine 1.5 billion cubic meters of sulphur-containing gas annually. A guarantee of the reliability of refining Mubarek gas and delivery of it to customers became possible with introduction of this unit.

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## OIL AND GAS

### OIL PRODUCTION AND EQUIPMENT REPAIR IN TYUMEN OBLAST

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in English 20 May 84 p 1

[Article by V. Borodin: "Selection of the Target"]

[Excerpts] The country received the first tons of commercial Tyumen oil from the interior of the Ust-Balyk and Shaim fields 20 years ago. It would seem that the underground storehouses of the Yuganskneftegaz Association should "become depleted" during these years--after all, fields, like people, age. They give the oil field workers ever more concerns with age: additional wells must be drilled, they must be converted to mechanized production and different methods of increasing the oil yield of productive beds must be assimilated. However, most fields of the veteran of the oil-producing industry of the oblast even now operate with envious efficiency and profitability. Why?

"Accurate selection of the target is half the success," says the general director of the Yuganskneftegaz Association Yu. Vershinin. "And we set ourselves a difficult goal--to extend to the maximum extent the life of each well. This work was begun even at the end of the last five-year plan."

It was then that the mean cycles between repair of the electric centrifugal pumps (ETsN) reached a critical stage in the fields of the association--they did not exceed 200 days. It was decided to establish as the basis of the restructuring the experience of the Bashkir oil field workers from the oil- and gas-producing administration 'Arlanneft', where a specific stock of wells is assigned to a brigade of repairmen working on a nonwarrant basis of wages.

It was difficult to break into the consciousness of oil field workers, who were accustomed to receive their main oil bonus due to the drillers turning over new wells for operation. And the work of the brigades was evaluated at that time by their number rather than by the quality of repairs. Moreover, the brigades were also not interested in reliable operation of the underground equipment.

With conversion to a progressive system of organization and wages, fulfillment of a complex of geological engineering measures and of the oil production plan rather than the number of repairs became the main thing for the repair service. But it is known that the amount of the end product--oil--depends on the quality of engineering servicing of the field. Careless work (you would

only record more repairs in your log!) now became disadvantageous to the brigade itself, which is a part of an integrated collective that services the field. Moreover, time standards were introduced for all types of work and payment for reduction of their deadlines and expansion of the maintenance zones. The requirements on the quality of repair of submersible pumps at the central base for hire and repair of oil field equipment also became more rigid.

And things became better. The mean cycles between repair of the electric centrifugal pumps was doubled and reached 405 days--the best indicator in Glavtyumenneftegaz [Main Tyumen Administration of Oil and Gas]--only within the last 3 years of the current five-year plan. The stock of wells converted to mechanized production was also doubled. The Nefteyugansk workers are now producing 64 percent of the oil by this method. During the first quarter of this year alone, 253 wells were converted to mechanized production (one-third of them are producing above the plan), which also produced half their fuel above the plan.

Much has also been done to improve the work of the major overhaul brigades for the wells. And this is perhaps the most lagging section in the complicated oil production. It is known how the oil workers toil with emergency wells, especially when a leak of an operating string is detected. A month or more sometimes passes to "treat" this shaft. But as they say, the Nefteyugansk oil workers here are completely up to date--the known operating and idle wells are below the norm.

The organizers of the competition for the important Tyumen oil are daily implementing with intense labor the decisions of the April (1984) Plenum of the CPSU Central Committee on further intensification of production. Labor productivity in the association increased by 1.2 percent above the plan, while the product cost was additionally reduced by 0.9 percent during the first quarter of this year.

Striving to extend the life of each well literally to the maximum extent, development of new fields, four of which should be put into operation during this five-year plan, is being carried out in the association at rapid rates. It is planned to bring the volumes of drilling next year up to three million meters mainly due to an increase of labor productivity. The output per brigade during the first quarter was increased by 16.5 percent above the planned level. And the increase is almost 20 percent during 3 years of the five-year plan as a whole.

This is the result of the selfless labor of the best oil field workers. The drilling brigades of foremen A. Slyunin, S. Ogeynikov and others have drilled 70,000 or more meters of rock each this year. As they say, they are following in real earnest the leader of the competition--the brigade of foreman S. Pomogaybin, which established a record under local conditions--82,000 meters of drilling.

The Nefteyugansk fields have become the cradle of many technical innovations, generated both by local innovators and by scientists and designers. Almost 6.5 million rubles were conserved last year alone due to this. The innovators have conserved 300,000 rubles during the first quarter of the year.



Discipline and search are the main routes of travel toward thriftiness. Planning to conserve 10 million kilowatt-hours of electric power and 1,400 tons of conventional fuel during the first 3 months in their pledges, the collective of the association has "missed the mark" somewhat. They actually conserved an additional 2.5 million kilowatt-hours and 500 tons of energy resources above the adopted pledges. And this means that the organizers of the competition have far from exhausted the reserves for intensification of production. New peaks await them.

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## OIL AND GAS

### LAG IN TURKMENISTAN GAS PRODUCTION CRITICIZED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 May 84 p 2

[Article: "Efforts Have Been Combined"]

[Text] The causes of the unsatisfactory work of the VPO [All-Union Production Association] Turkmengazprom were revealed by SOTSIALISTICHESKAYA INDUSTRIYA in an article on 17 February 1984 under the title "Let Us Name the Laggards." Both the gas workers themselves and their allied builders were subjected to criticism.

The deputy minister of the gas industry S. Kashirov agreed with the critical comments toward the association and Mingazprom [Ministry of the Gas Industry]. He wrote to the editors that measures have now been adopted to ensure introduction and stabilization of the work of the most important facilities of the Turkmengazprom and Sredaztransgaz Associations.

At a meeting of the board of directors of Mingazprom on the results of work during the first quarter, the chief of the VPO Turkmengazprom V. Talday assured the board that the lag in gas production will be made up during the second and third quarters of this year. The course of construction of the energy facilities of this association was considered at a meeting of the board of USSR Minenergo [Ministry of Power and Electrification] and also at a meeting at Ashkhabad, wrote M. Gorskiy, chief of Glavvostokelektrosetistroy [Main Administration for the Construction of Electric Power Networks in the East, USSR Minenergo].

The adopted measures made it possible to introduce new capacities at the Uch-Adzhi and Sovetabad fields and to complete construction of the electric power transmission line to supply energy to the Uch-Adzhi and Dauletabad fields and also the water intakes of Sovetabad. The Turkmen gas workers have been coping with the plan in April and May and since the beginning of May alone they have shipped to customers approximately 20 million cubic meters of natural gas above the plan.

The builders are also overcoming the lag, which the deputy minister of construction of oil and gas industry enterprises Yu. Andreychev reported. They are introducing more and more new facilities. The chief of the Turkmennftegazstroy Association A. Sviridov indicated a need to monitor the introduction of integrated gas preparation plants and to turn them over within the deadline: at the Severnyy Balkui field in May and at the Serab field in June.

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## OIL AND GAS

### NEW HYDRAULIC DRILL UNIT QUESTIONED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 21 Jun 84 p 2

[Article by Ye. Panov, special SOTSIALISTICHESKAYA INDUSTRIYA correspondent: "A Doubtful Version"]

[Text] "Should a new technique be promising?" thus begun the letter. A strange question! But A. Plandovskiy, a worker of VNIIneftemash [All-Union Scientific Research and Planning-Design Institute of Petroleum Machine Building], reported to the editors that their department is developing a machine which "is uncompetitive at present, will not be competitive in the future, neither on the worldwide nor on the internal market, since it is inferior to its prototype in a number of the most important indices."

He was talking about the Bag 20 hydraulic unit, designed to drill for oil and gas in geophysical and structural-test wells up to 1,000 meters deep. We have machines of this class, they correspond to the designation and we sell them abroad. The salt of the new machine is the hydraulic drive. Soviet drilling technology, in order not to lag behind, should be equipped with it as soon as possible.

Therefore, it was thought to combine the advantages of hydraulics with the advantages of developed methods of drilling and with the pluses of the usual technique in the BAG. It turned out, according to A. Plandovskiy, just the opposite: the potential advantages of hydraulics are not given to realization due to the technical imperfection of the design and the usual technique has to be rejected. The matter has now been aggravated in the stage of modification of the detail design. It was considered at the end of last year (it was only considered rather than adopted by the manufacturing plant). The report was so inconclusive that, in all obviousness, it masks the possibility of "an orderly retreat." This is valid: after all, the basis of the detail design was a faulty contract design. A chain of errors ensues from it. The group that begun to be involved in the BAG essentially fell apart--three of the leading specialists were fired. But Plandovskiy himself, not desiring to participate in useless work, does not participate in it. He preferred to step aside rather than gain the reputation of a "faultfinder" and "loafer." It is not excluded that things will be smoothed out with him as they were with other unsuitables. This is the letter.

Because of this letter, I also travelled to Kuybyshev--department No 12 is off by itself, 1,000 versts from the Moscow Institute. Aleksandr Yevstaf'yevich was not happy to see me. He was tired, he was depressed. "Why did I bring all this up?" he asks. "I am breaking my lance, like a child, and I only have 1 year until retirement. And what will be gained?"

A valid question. No less valid is another as well: How would matters have ended where Plandovskiy has been working not as a routine executor, but as the main designer of the BAG 20 design, on which he has been working since 1981. What is the result?

It is unclear, but it is not excluded that Plandovskiy is correct. In December 1982 the contract design of the BAG was lying on the desk of the chief engineer of VNIIneftemash V. Yermolayev together with the conclusions signed by the head of department No 2 L. Andreyev and the chief designer of the project D. Lebedev. The conclusions determined a "negligible, within the range of 5 percent, increase of productivity," since the "feasibility of the design of the new unit is doubtful" with the higher cost of it compared to the prototype.

How would you, reader, proceed in the position of Vladimir Nikolayevich? Would you have confirmed a doubtful design, having earlier agreed to doubtful qualities of the future machine and doubtful expenditure of funds? Or would you have returned to modification, writing off the losses of several months, but in total having achieved quality and having saved money? The chief engineer confirmed the design. He confirmed it, understanding well the complexity of the situation.

The fact is that the department was formed from two departments at one time. Whose topic was placed in the background? Whose pride was wounded? "No other department could cope with 12 such slanders!" the chief engineer said in his heart. Is it not surprising that, according to his very evidence, the department has developed only one efficiency hydraulic unit since 1975 and a unique one at that?

And nevertheless the managers of the institute risked their trust in the department to develop the BAG--a new, important and principal matter. However, this very debatable decision contained its own logic: Here is a crucial task, here are rigid deadlines, there is no time to make a row, it is time to work. And they will work, regardless of the consequences!

Alas, there is no hope for self-recovery of the department. The collective did not rally round the crucial assignment. Yermolayev visited Kuybyshev several times and knows the style of work there. Some (for example, A. Plandovskiy) doubted everything and did not take one step. Others (let us say, the manager of the topic, the sector deputy N. Zinin) rushed forward without fear and doubts. There was no agreement of the designers and it was not foreseen.

And now the fruit of this "method" is lying on the chief engineer's desk--the contract design of a new machine, which promises a negligible increase of productivity and which costs more than the old one. And the chief engineer

confirms it. Why? Because he sees that give him 6 months or a year more--in 6 months or a year it will become doubtful and they will quarrel and accuse each other of mortal sins. But there is a plan and there are deadlines. The detail design had to be completed by the end of 1983. An experimental prototype was produced during the fourth quarter of 1984. This means that there must be a stop somewhere. And Yermolayev takes responsibility on himself. Let this doubtful version drive him out of his mind, he decides. At least let the principal role. What will happen is unknown. No one was fined for lack of success in the new matter. It is quite possible that the prototype will have to be written off and everything begun anew. But a negative result is also a result.

What then we produced it. And if one still must analyze it from the engineering aspect, it is obvious in the moral sense. A convenient slogan about a negative result in department No 12, having adapted to its role, is willingly praised. It is now very popular here. It may be that the BAG will be unsuccessful. If so that is science!

I have no quarrel with respect to science. If it states that a perpetual motion engine is impossible, then it is impossible. But a hydraulic drilling rig is quite possible. Development of it has a very remote relationship to science and are not at all steps into the unknown. They simply did not know how to resolve it intelligently. There is nothing strange. The situation in the department was below any criticism during the past year. Examples? The theme manager Zinin and the chief designer of the project Plandovskiy are two reliable elderly men, write memoranda to each other--you read slander. Specialists leave the department under the threat of a battle between them. It comes to the point that the department head A. Vetman is forced to forbid production meetings with respect to the BAG--they "are transformed to a bazaar" each time. Finally, unable to tolerate a "bazaar," Vetman also leaves the department.

E. Ayzuppe, who replaced him, posed new tasks to the collective in a report at a party meeting. Scientific and technical ideas above the plan should be advanced and developed, he said. Only this path will provide a future to the department and will free it of capriciousness from above. Only in this way can one respect oneself and cope with one's scientific profile, the new head stated, and here, in the eyes of one's subordinates, this profile has been drawn: automation of drilling processes, microprocessor hardware and a robot driller.

Is it appealing? Is it modern? And how! Ayzuppe followed a noble goal: to bring the collective out of creative lethargy through strong efforts. Only the planned "profile with the BAG" seemed both appealing and promising and one had to assume that inviting speeches were also pronounced with respect to it. The BAG has now departed. The robot driller is now more important.

V. Yermolayev feels that the department, having received a bloody nose, is still obligated to develop microprocessors. "If you don't know how learn how! Retrain! Seek progress!" the chief engineer says vigorously. But, no one removed the BAG from the department and no one is planning to. True, the plan

has been corrected somewhat. The deadline for the appearance of the full-scale prototype has been postponed to the middle of next year. With transition to 1986. And so on. One cannot lose one's mind until a result is produced--although it is unconditionally negative. The criterion of truth is practice.

It is unacceptable to dispute classical statements. However one must. A total of 200,000 rubles has already been expended on development of the unit. The price of the full-scale prototype is another 150,000-200,000. This amount can be saved by spending more intelligently if one stops, looks around and evaluates clearly what has been done. I think that just this should have been done a year and a half ago. And a year ago. And 6 months ago. But it is still not too late. One must be brave enough to emphasize one's errors and begin work anew. Otherwise one cannot move forward. Otherwise, no one will find out whether the robot driller will share the fate of the BAG. One doubts that the department, having developed a single valuable machine within 10 years, will suddenly begin to create miracles in microprocessors. Regardless of how progress is urged, people determine it.

P.S. The director of VNIIneftemash N. Umachik, chief engineer V. Yermolayev, his deputy L. Mirzoyan and the department head L. Andreyev read this article in manuscript. They stated as previously that the method of the "negative result" in design work is justified. Moreover, they feel that the article may close the books on the BAG 20 and microprocessors, but "amateurs write," having imagined themselves "on a horse," and heap on complaints. We warn the possible addressees, while even 100 articles are incapable of "covering" a promising direction. It is comforting that an engineering council is planned at the institute for July, which will objectively evaluate what has been done on the hydraulic drilling unit and will plan a further course.

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## OIL AND GAS

### URENGOY GAS FIELD TO START AUTOMATED PRODUCTION CONTROL

Moscow IZVESTIYA in Russian 25 May 84 p 1

[Article by A. Dergachev, special correspondent of IZVESTIYA: "Electronics Will Help"]

[Text] A microprocessor complex for automated control of gas production in the Urengoy field has been sent from Krasnodar to Urengoy by a special scheduled flight.

The complex was manufactured and developed by the Krasnodar SPKB [special planning and design office] Promavtomatika of USSR Minpribor [Ministry of Instrument Building, Automation Equipment and Control Systems].

The chief of the design office Ye. Osipov comments on this event at the request of an IZVESTIYA correspondent.

"An ASU [automated control system] is being developed at Urengoy, which will permit automation of gas production processes and of preliminary processing of the gas for transport over major gas pipelines. It is this task that has been posed to the collective of our design office, which is the head office in USSR Minpribor on gas production control systems."

The use of computers at Urengoy will permit an increase of efficiency in production of raw material and preliminary processing of it. Here is just one example. It is known that Urengoy condensate is an excellent raw material for production of high-octane gasoline, diesel fuel and so on. According to our calculations, optimization of the production processes will permit an increase of condensate production by 5-7 percent without additional expenditures.

A field automaton, operating without people, is planned in the near future. The gas workers demanded this of us: after all, watch maintenance is too expensive. There is a constant shortage of highly skilled personnel. The reason? The working conditions at high latitudes have been too severe until now. In this regard, we should make the second step in the next five-year plan after introduction of this system--design an unmanned field automatic control system. The Yamburg field should become this project."

I listen to Ye. Osipov and I think that such a traditionally agrarian region as Krasnodar Kray was at one time one of the main gas-producing regions in our country. And this made it necessary to develop a special design office here, which occurred 25 years ago. The most diverse automation equipment developed by this collective is operating reliably throughout the entire country: in the Arctic at Urengoy, Vuktyl, Medvezhye and Messo-Yakha and in Central Asia at Urta-Bulak, in the Orenburg area and in other gas-bearing regions.

And now an essentially new control system--the microprocessor complex--has been developed. We do not yet have a similar system in the country.

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## OIL AND GAS

### FIRST EXPLORATORY WELLS AT YAMBURG COMPLETED

Moscow IZVESTIYA in Russian 29 May 84 p 2

[Article by A. Trutnev: "Yamburg Opens Up Its Books"]

[Text] Drilling the first group of exploratory wells has been completed at the Arctic natural gas field--Yamburg. Yet another gas storehouse of the Tyumen North has begun its later biography.

This new word--Yamburg--resounded from the pages of newspapers quite recently. It now means the establishment of a new gas-producing center on the Tazov Peninsula, at so-called subarctic latitudes. Temperatures of -50° are common here and if a steady wind is blowing from the Arctic Ocean. The drillers and builders of the Ministry of the Gas Industry are working under these conditions.

Winter frequently reminds one of itself beyond the Arctic Circle. Clumps of frozen snow sparkle in the sun everywhere. Obskaya Guba is filled with ice even though it is May outside.

Two streets of the pioneer town of different colored rail cars extend not far from the shore. The watch workers, who are developing the new gas field, live here. And the Arctic Deep-Drilling Expedition--a veteran of the north--is drilling it. It left for Medvezhye more than 10 years ago and drilled the first wells of Urengoy.

The work site of the Arctic expedition is several tens of kilometers from the settlement. This was non-flying weather and one could not count on "hitchhiking." But I was lucky: a powerful Ural truck was sent there with some freight or other.

Here is the first derrick rising in the cold haze. Alongside in a rail car is the "command station" of the drilling rig. There is also housing and a working office of the chief of the rayon engineering production service A. Rzhevskiy. He has been at Yamburg from the first days. He was present at assembly of the first drilling rig and set up the derrick and the brigade of V. Gavrilenko began to drill the new field.

The first "cluster" of wells is now ready. Each of five shafts, which penetrate the hard frozen soil, is capable of producing as much fuel as required for a city with tens of thousands of residents.

The work at Yamburg is developing. A large prefabricated housing complex has been delivered to Obskaya Guba.

"This settlement, which is 4 kilometers from shore, will have a dining hall, polyclinic, club, bath and social center," says the chief engineer of the board of directors for development of the Yamburg field Ye. Posadskiy. "Construction of the first two 16-apartment buildings from prefabricated modular units will begin."

The first gas of Yamburg will go to provide the needs of the industrial base-- it will supply the boiler room and electric power station. After all, to provide an intelligent and clear assault on the Arctic tundra, reliable rear forces are required. Roads are needed and one cannot get along without them in the Arctic, where there are swamps at every step. The builders of Min-energo [Ministry of Power and Electrification] began to lay an electric line from the northernmost integrated gas preparation plant at Urengoy to the Yamburg field.

Approximately 12,000 tons of various types of cargo was delivered to the field during the past navigation season through the navigable channel, which was constructed here by the explosive method, and it is planned to deliver almost half of all cargo to the new field through Yamburg port.

The drillers of the young Arctic field are going farther and farther north. The specialists of Nadymgazprom [possibly Nadym Gas Industry Association] who are conducting all operations, are faced with a primary task: to fill in the sites and begin installation of four additional drilling rigs. Everything has been done at Yamburg so that the first gas of the Tyumen Arctic storehouse reaches the consumers in 1987.

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## OIL AND GAS

### SUPERDEEP DRILLING PROGRAM PROGRESS REPORTED

Baku VYSHKA in Russian 9 Jun 84 p 2

[Article by A. Gol'denberg, correspondent of Azerinform: "To the Depths of the Interior"]

[Text] The experience of drilling Kola and Saatly superdeep wells will be used in implementation of the national deep drilling program, worked out in the Soviet Union.

This program, USSR State Prize winner N. I. Andrianov, scientific secretary of the interdepartmental scientific council of the USSR State Committee for Science and Technology, who is coordinating all operations, reported to the Azerinform correspondent, envisions drilling 10 more wells. Drilling the first two of them has already begun. One shaft will open up the interior in the Dnepr-Don zone (near Poltava), while the second will open up the interior in the Caspian zone (Kazakhstan).

Preparation for drilling seven more wells is under way.

The integrated deep drilling program is designed up to the year 2000. Implementation of it will make it possible to create a reliable geological base for further exploratory and test drilling for oil, gas and ore, will increase their efficiency and will reduce the volumes of expensive drilling.

It is difficult to overestimate the scientific significance of this outstanding scientific and technical experiment, which opened up access to the lower layers of the earth's crust to scientists, about which people until now know less than about space. And the principles of age-old fluctuations, the genetics of formation of minerals and many other still puzzling phenomena are related to them.

Implementation of the deep drilling program, in which 150 scientific research institutes, enterprises, ministries and departments of the country are participating, became possible due to the enormous advances of Soviet scientists and specialists. They developed and continued to improve essentially new drilling and research equipment, which operates under high temperatures and pressures, and worked out an original technique of drilling and study of the interior. The drilling equipment developed at Uralmash [Urals Heavy Machine

Building Plant imeni Sergo Ordzhonikidze] and other plants, has given a good account of itself on the Kola Peninsula, where the depth of the well is approaching 13 kilometers, and at Saatly, where the bottom of the shaft has reached the 8-kilometer mark for the first time in Azerbaijan.

However, the Saatly well, which I visited, noted N. Andrianov, could reach considerably greater depths. Elimination of an accident has been delayed here. The leading work here must be accelerated in cutting a second shaft and maximum efforts must be applied to attempt to surpass what has been achieved.

The 37th International Geological Congress, within the framework of which a symposium on deep drilling will work, will be held in August this year in Moscow. Its participants will visit the Kola and Saatly wells, which have achieved the beginning of implementation of the integrated program for study of the deep structure of the USSR. Implementation of this complex program will help to refine the existing concepts about the structure of the interior, to evaluate the prospects for mineral prospecting in different regions of the country and to determine the most effective directions of exploratory and test operations. This will contribute to implementation of the decisions of the 26th CPSU Congress, directed toward accelerated development of scientific and technical progress and earth sciences, and an increase of proven reserves of mineral resources.

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## OIL AND GAS

### OFFSHORE DRILLING IN BALTIC

Moscow SOVETSKOYE ROSSIYA in Russian 7 Feb 84 p 3

[Article by Yu. Shebalkin: "A Drill Rig Above the Baltic Sea"]

[Excerpts] The Kaliningrad oil workers yesterday began operations on an oil platform in the Baltic Sea. The brigade of drillers of foreman N. A. Gurin drilled the first 150 meters of the offshore well. There are more than 2,000 meters remaining to the oil bed. The day before the event our correspondent visited the "island of steel."

The Baltic is stormy and capricious. The waves weave a shaman dance. There is no need to talk about landing on the platform in this stormy weather. We waited 3 days for good weather. The wind is calm today. We finally received the dispatcher's "go ahead" to leave. The small tug "Kembriy" moved away from the quiet harbor into the open sea.

"We will see the derrick in about 40 minutes and we will reach the platform within an hour," says the captain of the "Kembriy" N. S. Gunin. "This is easy now."

The builders made their first landing on a single support block, previously installed in the sea in the fall of 1982. A steel pivot measuring 100 square meters was completed by 12 welders, electricians, diesel mechanics, installers and a portable electric power plant.

"As bad luck would have it, squally weather began during debarkation," recalls the chief of the section Vasiliy Denisovich Solov'yanchik, then supervisor of operations. "We thought that it would blow us into the sea. We then became accustomed to it. We worked intensively. We had to catch every moment of good weather. We had to construct two platforms--one for the drilling rig and one for the living quarters, and we had to secure 170-ton sections to the bottom of the sea and to connect them to the platform."

To raise a drilling derrick is even a complicated matter on land. And at sea? The Kaliningrad oil workers were familiar with the experience of constructing offshore platforms in the Caspian and Black Seas. But it is one thing to see a finished derrick and it is another to build it yourself. They learned during the work.

"We had to drill 48 wells to almost 80 meters, to drive in pilings and weld the anchors. We frequently worked in risky situations."

"Solov'yanchik loves risk," I recalled the words of the chief of the Kaliningrad Offshore Drilling Administrative V. F. Ryzhenko. "The best qualities of the modern young supervisor are combined in this 30-year-old petroleum engineer: high engineering intelligence, innovation, efficiency and optimism. Drilling foreman I. Nikonov, foreman A. Biryukov and virtuoso welders A. Suchkov, M. Babak and S. Sikorskiy are his subordinates. It is through the efforts of their comrades that the "island of steel" is raised above the sea. This is the first in the Baltic."

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## OIL AND GAS

### TELEMECHANICS IN AZERBAIJAN OIL PRODUCTION

Baku VYSHKA in Russian 17 Apr 84 p 3

[Article by Doctor of Technical Sciences A. Suleymanov, deputy director of Gipromorneft' Institute, and Doctor of Technical Sciences I. Nabiyeu, head of Department of Automation, Telemechanics and Electronics, AzINEFTEKhim imeni M. Azizbekov]

[Text] Problems of introduction of new progressive hardware, extensive automation and telemechanization of main production processes have played the most important role during the past few years in solving the problem of increasing the volumes of oil and gas production. Development and introduction of unit telemechanical complexes is a timely problem on sector-wide scales and in diversification of technological processes of oil production. Figuratively speaking, telemechanics is today not only in the eyes and ears of oil workers. In combination with modern computer hardware and control devices, it permits monitoring and control of facilities, separated by tens of kilometers from the operator, with high accuracy. The functions performed by it--monitoring and accounting of the yield of wells, analysis of complicated situations and diagnosis of the condition of equipment--permit a significant reduction of the expenditures of human and material resources, which is especially important for regions with severe working conditions, and make it possible to reduce the losses of oil.

Development of modular telemechanical complexes for the petroleum industry was begun at NIPI Neftekhimavtomat [Scientific Research and Planning Institute for Integrated Automation in the Petroleum and Chemical Industry] at the end of the 1960s. Basic modular complexes of telemechanical hardware PAT Neftyanik-TM-600M on a second-generation component base and the Neftyanik-TM-620 and TM-620-01 based on integrated microcircuits--the third-generation component base--were developed. Development of the complexes and organization of their production at the republic's plants was accompanied by improvement of the structure of instrument building production and by introduction of progressive production processes and standardized types of designs. The successful organization at the Baku Production Association Geofizpribor of the technique of producing two-sided printed-circuit cards should especially be noted. All this made it possible to convert the production of telemechanical complexes to a flow-line, industrial base and in the final analysis contributed both to meeting the needs of oil workers and to development of instrument building in the republic as one of the sectors that determine scientific and technical progress.

Development and organization of serial output of modular telemechanical complexes created good prerequisites for successful solution of the tasks posed by the Central Committee of the Azerbaijan Communist Party to improve the structure of the republic's industry and to develop progressive sectors of industry.

Parallel with continuous improvement of the technical characteristics of modular telemechanical complexes, their reliability under real operating conditions was studied and investigated. This aspect of the work is of interest both from the viewpoint of evaluating the effectiveness of the adopted engineering solutions and for developing substantiated measures to increase the quality of manufacture and improvement of the operation of the complexes. The investigations encompassed essentially all the most important rayons of Azerbaijan, Western Siberia, the Volga area, Turkmeniya and Kazakhstan, where modular complexes were operated. According to data gathered at 22 oil- and gas-producing administrations, quantitative evaluations of failure-free indicators and the repairability of articles were obtained and the factors were determined that affected these indicators under operating conditions. The derived data made it possible to introduce changes in the design of the new complexes and to improve organization of their operation.

Traditional telemechanics can no longer meet the needs of the oil workers with development of oil and gas production in the arctic regions and in the fields of the continental shelf. The fact is that cable communication channels were used until recently in telemechanical systems, which is very expensive under arctic conditions. This is a very serious problem, especially if one takes into account the Siberian scales at which the wells are scattered on areas of several thousand square kilometers, failures of cable lines due to sharp temperature drops are frequent and restoration of them is complicated under conditions of the spring-fall season of bad roads. Considerable difficulties also arise when using cable communication lines in offshore oil production in the Caspian Sea.

A complex of telemechanical devices with the Khazar communication radio channel was developed by the institute on the same component base for the first time in Soviet practice in this regard. The wells are monitored and controlled by radio when using this system. Radio stations installed at the control stations transmit data to the dispatcher station about the operation of equipment, while the operator in turn uses the radio channel to control the operation of the wells. Telemechanical complexes with radio communication channels are now being operated successfully in regions of the Tyumen Arctic, and introduction of a single Khazar complex provides a saving of 200,000 rubles annually due to the use of a radio communication channel alone. Most oil- and gas-producing facilities in Tyumen Oblast will be equipped with the telemechanical systems having radio communication channel in the future.

Industrial production of modular telemechanical complexes has been organized by the Baku Production Association Geofizpribor and by the Baku Instrument Building Plant. More than 300 complexes with a total number of more than 15,000 units, which is being installed at the facilities to be monitored, are now produced. More than half of the produced complexes has been certified by high category of quality.



Introduction at these enterprises of automated diagnostic and monitoring systems of malfunctions and assemblies and units of the produced equipment contributed to a significant degree to the increase of quality and reliability of telemechanical complexes and to an increase of the technical level of instrument building enterprises of the republic.

The current scientific and technical level and high economic effectiveness of modular telemechanical complexes provided wide introduction of them not only in all the oil-producing regions of the country.

The Kaspiy telemechanical complexes were operated successfully for the first time in Soviet offshore oil production for almost 10 years under the complex maritime conditions of the NGDU [oil and gas production administration] imeni Narimanov, Artemneftegaz and imeni Serebrovskiy. The instrument building enterprises of the republic have produced telemechanical complexes worth a total sum exceeding tens of millions of rubles. In this case each ruble invested in telemechanization of oil production yields five rubles profit. More than 80 percent of all the country's oil is now produced at telemechanized fields.

Utilizing the experience of developments carried out earlier, the scientists and producers are now working on the prospects of development of telemechanical complexes, also designed for facilities of the gas industry, reclamation, water management and other sectors and designed on the fourth-generation component base, microprocessor hardware.

The first industrial experience in the use of these complexes at facilities of Kaspormorneftegazprom [Association for Offshore Oil and Gas Exploration in the Caspian Sea] indicates the high effectiveness of the given direction of work, with regard to which it has been decided to equip all offshore oil-production facilities in the Caspian with the new telemechanical complexes.

The paper "Development and Organization of Serial Output at Instrument Building Plants of the Republic and Extensive Industrial Introduction of Modular Telemechanical Complexes for the Petroleum Industry" is the result of many years of creative cooperation of the scientists of NIPI Neftekhimavtomat and of the instrument builder-producers. Advancement of the authors of this paper, consisting of A.A. Abdullayev (supervisor of the paper), A.A. Dzhavadov, K.V. Veliyev, B.O. Akhmedov, M.G. Grinberg, F.D. Agadov and Yü. I. Lavrov for the State Prize of the Azerbaijan SSR is recognition of the services of the collective of developers to accelerate scientific and technical progress in the leading sectors of the country's national economy.

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## OIL AND GAS

### OFFSHORE PLATFORM PRODUCTION PLANT OPERATING IN BAKU

Moscow PRAVDA in Russian 12 May 84 p 2

[Article by L. Tairov, PRAVDA correspondent: "'Islands' From Building Berths"]

[Excerpts] The first unit of an offshore platform construction plant is operating at Primorsk. By the end of the year, the first man-made island weighing almost 20,000 tons and the height of a 30-story building will be launched from the building berths of the enterprise.

Construction of this enterprise is provided for by the Basic Directions for the Economic and Social Development of the country. It is intended for production of stationary offshore platforms, from which wells can be drilled through water up to 200 meters deep. The innovation will make it possible to increase the efficiency of finding raw material pools on the shelf of the Caspian and other seas and to exploit more rapidly the underwater oil and gas storehouses.

The plant is laid out on an area of 200 hectares, of which 80 are on the offshore shelf. Construction of the enterprise is continuing. Vessels of Chernomortekhfлот [possibly the Black Sea Technical Operations Fleet] are deepening the bay here by several meters so that barges with such heavy cargo can travel through it. The collective of the Aztransstroy Trust are working successfully here as well.

The facility of the general contract trust No 7 of Minpromstroy [Ministry of Industrial Construction] of the republic is an auxiliary pier. Its collective began work on construction of the main building by the brigade cost-accounting method.

"This will help us to avoid idle times and make labor more rhythmic," says brigade leader A. Efendiyev. "The builders, having organized related occupations, utilized the method of the continuous production chain."

The well-organized socialist competition, which orients each brigade to achieving specific goals, also contributes to success. Smoothness and comparison of the results of labor of the competitors are important in this matter.

A line of the pipe-manufacturing shop, which is designed to produce 15,000 tons of articles annually, has just now become operational.

Skilled personnel are needed to develop the complicated equipment. Therefore, training of the specialists was begun at the enterprise even before introduction of the shop. Rolling-press operators T. Kerimov and I. Ismailov were trained at similar plants at Cherepovets and Belgorod. Their experience is now of assistance in development of the new technique.

The workers were sent for prolonged training at facilities of Minmontazhspestroy [Ministry of Construction of Special Installation and Construction Work] and a workshop was created locally to manufacture nonstandardized equipment, where the workers were trained in installation and adjustment of equipment and startup of production.

The builders have made progress. However, some items of the socialist pledges of last year have not been fulfilled. For example, the deck framing has not been introduced and the construction of the building berths and engineering supply lines is being delayed.

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## OIL AND GAS

### YAKUTSK OIL AND GAS PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 Jun 84 p 2

[Article by M. Gubkin, secretary of Yakutsk party obkom: "The Oil and Gas of Yakutiya"]

[Text] The Yakutsk obkom of the CPSU is preparing a report of the Geological Production Association Lenaneftegazgeologiya for the bureau on organization of a socialist competition for an above-plan increase of labor productivity and reduction of product cost. The selection is clear even from posing of the question itself: to see how the struggle to fulfill the party's additional task will serve the main goal of the collective--acceleration of paration of the republic's oil reserves.

The forthcoming discussion can be regarded as a continuation of a conversation which was held a year ago at the secretariat of the obkom. An increase of the labor productivity of drilling brigades at Lenaneftegazgeologiya Association was discussed at that time. Incidentally, more than one party document could be named here. Since the oblast committee bureau of the party confirmed the integrated program for development of geological prospecting work for oil and gas in Yakutiya for 1981-1985 at the beginning of the five-year plan, we have returned constantly to this topic in one way or another. After all, our own fuel and energy base means a real revolution for the economy of the republic! But the oblast committee of the party regards this work as a part of a general party problem: to create a large new raw material base of the oil- and gas-producing industry in the eastern part of the country at accelerated rates.

Confirming the integrated program of geological prospecting work of the association for the five-year plan, the party obkom evaluated it at that time as minimal. Therefore, all subsequent activity of the party organization of the republic in this direction had one goal in the final analysis--to make the forecasts about the prospects of oil and gas in Yakutiya a reality as soon as possible.

This reality appears sufficiently convincing today. A total of 15 fields of hydrocarbon raw material have been identified in Western Yakutiya alone. The first oil fields have also been discovered here.

The southwestern region, where four new gas and oil fields were added during the current five-year plan alone, was also promising. The raw material base prepared here, according to estimates of the All-Union Scientific Research Institute of the Gas Industry, provides the opportunity to develop a large refining complex.

It also deserves attention because of the fact that it is located in an industrially developed region. And this means that the gas can be regarded not only as a raw material for production of valuable chemical products but also as one of the most effective versions of heat energy support of operating enterprises and those to be designed for production of diamonds, nonferrous metals and potassium salts of Western Yakutiya and the adjacent regions of Irkutsk and Chita Oblasts. That which has now been determined permits one to hope that the main discoveries are still to be made! Exploration and prospecting need only be carried out more vigorously and more effectively. Therefore, the oblast committee of the party is not losing sight of the work of the oil and gas prospectors, directing the efforts of the collectives toward solution of key problems by requiring clear coordination of efforts, technical re-equipping of the sector, development of their own construction industry base for development of expeditions and fields and to provide working and recreation conditions for people.

They are of course awaiting the assistance of the RSFSR Ministry of Geology.

Stability in material and technical support is necessary: when there are no drilling heads, core-sampling equipment and geophysical instruments, this means not only idle time of the brigades but also unreliable data from the interior. Drilling equipment especially for the Arctic, high-penetrating machines and cold-resistant pipes are necessary--these problems are being solved very slowly.

Besides the problem of creating a strong raw material base, there also arises another--economical use of what has been discovered and proven.

According to the commission of the oblast party committee by the Lenaneftgazgeologiya Association, together with the Yakutsk branch of the Siberian Department, USSR Academy of Sciences, the Yakutgazprom Production Association has worked out a proposal on a sharp increase of the volumes of natural gas production in the republic. The problem of thermal energy supply to the entire Far Eastern region was solved. Different versions have been considered here: delivery of Yakutsk gas to the zone of the Eastern Section of the BAM [Baykal-Amur Main Line Railroad] and to the industrial regions of Khabarovskiy Kray and Amur Oblast and the use of it at enterprises of Irkutsk Oblast.

Calculations of the department of economics of the Yakutsk branch, Siberian department, USSR Academy of Sciences, confirmed the high effectiveness of any of the possibilities. Specialists of the institute of economics and organization of industrial production, Siberian department, USSR Academy of Sciences, have reached the same conclusion. Our proposals have aroused great interest among the party committees and community of adjacent oblasts, to which we have also sent this document. This is a "matter of detail." Who will take on implementation of the project? This is a complicated question.

Let us turn for an example to the Aykhal-Udachnyy industrial region of the republic, where a shortage of fuel and energy resources is especially felt. The Vilyuysk GES does not even support the current needs of the area enterprises, but there will also be new ones here. But even if introduction of the GES-3, now under construction, is taken into account, a shortage of electric power is anticipated in this region in the next few years. The problem can be solved only by introduction of Yakutsk GRES-2, but to remove the "peak loads," the rayons must be gasified on an urgent basis--after all, more than half the energy of the Vilyuysk GES during the winter season goes to heat production and residential buildings. A gas pipeline must be constructed. But who is taking on this task here? It is felt that USSR Gosplan should keep its word.

The fields should operate! The use of gas would yield an advantage and not only for Yakutiya. We now import 300,000 tons of cement and if we had not organized production of our own, we would have imported two times more. Gas has relieved the shortage of electric energy in the republic. Gasification of the cities and worker settlements and further recruitment of it in electric power generation and specifically accelerated construction of Yakutsk GRES-2 provides the opportunity not only to remove this problem for nearby enterprises but also for the republic's central industrial region.

The same can be said about oil: the country provides Yakutiya with no more or less than two million tons of petroleum products. These are hundreds of rail cars, tank cars, trucks and thousands of people involved in loading, delivery and storage. The oil reserves in the republic permit us to talk about construction of a petroleum refining plant. But its proven reserves make it possible to begin production today.

Problems of oil production and refining in the Yakutsk ASSR were worked out in a technical and economic report and received a positive solution of the state expert commission of USSR Gosplan. During 1982 as well, the USSR Ministry of Geology and Mingazprom [Ministry of the Gas Industry] adopted a joint resolution on introduction of the Srednebotuobinsk field into experimental industrial operation. But whereas the geologists are mainly coping with their part of the work, the gas workers are not rushing to begin matters: there is as yet no design documentation, development of the field is proceeding slowly and the problem of beginning construction of the oil pipeline to Lensk remains open.

Experimental industrial production must be accelerated not only because of oil itself--it should provide answers to many questions which will arise tomorrow with large volumes of production. Practice should proceed hand in hand with science. Proper due should be given and the scientists of Yakutiya, the Siberian department of the USSR Academy of Sciences and many academic and sector institutes of the country are displaying great interest in development of the republic's fuel and energy base. Development of the project for development of an oil- and gas-production base has now become an integral part of the integrated program of the Siberian department, USSR Academy of Sciences, "The Oil and Gas of Eastern Siberia." More than 30 academic and sector institutes and vuzes are now working with the Yakutsk gas and oil workers in practical participation in developments and research.

But the new phase of work also requires new forms of interaction. Thus, at the suggestion of the party obkom, Mingazprom decided to create an integrated department of the VNIlgaz Institute [All-Union Scientific Research Institute of Natural Gas] at Yakutsk. This will permit more intelligent and local participation in compilation of projects for exploitation of the fields, drilling wells and integrated field research.

Many problems would also be clearer to academic science locally. It is not as simple to raise the matter without fundamental research. We are awaiting the decision of the Siberian department, USSR Academy of Sciences, to create a department for exploitation of oil and oil-gas fields at the Institute of Arctic Mining.

We have touched here only on problems, solution of which does not tolerate postponement. But all these problems are such that the efforts of the Ministry of the Gas Industry alone, to which has now been entrusted the development of the gas and oil fields of Yakutiya, cannot raise them. Along with strengthening the construction capacities of Yakutgazprom to carry out work, the construction organizations of USSR Minenergo [Ministry of Power and Electrification], Minneftegazstroy [Ministry of Construction for Oil and Gas Industry Enterprises] and Minvostokstroy [Ministry of Construction for Far Eastern Enterprises] must be recruited to complete the work. Prospecting and development of the fuel and energy resources of Yakutiya is in the final analysis part of implementation of the party's task for accelerated development of the new large fuel and energy base in Eastern Siberia.

And we should all here serve as the beacon of the words from the Annual Report of the CPSU Central Committee to the 26th Party Congress: "Today, looking 5 years or 10 years ahead, we cannot forget that the national economic structure with which the country will enter the 21st century will be established and created during these years."

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## OIL AND GAS

### GAS FRACTIONATION PLANT AT MAZHEYKYAY

Vilnius SOVETSKAYA LITVA in Russian 24 Apr 84 p 1

[Article by S. Skabeykis: "The Facility Has Become Operational"]

[Text] The gas fractionation plant has become operational at the second production complex of the Mazheykyay MPZ [petroleum refining plant]. The right to extract the first propane and butane from the experimental product was given to the shift of senior operator V. Zhabinskas. Operators I. Ragaynis and R. Kushleyka, equipment operator B. Grigalyunas and shift chief of the Orgneftekhimzavody Trust G. Glovatskikh also participated directly in production of the first product.

As was envisioned, the gas fractionation plant began operation at the end of the first quarter. This last section of the second complex is an impressive and very complicated structure.

"Six production columns have been installed here and approximately 30 pumps and a lot of other equipment have been assembled," says the deputy manager of the Mazheykyay Construction Trust V. Karalyus. "We have completed work worth more than one million rubles according to the general contract."

As before, ambassadors of other cities provided great assistance to the Mazheykyay workers. The brigade of installers from the Moscow Specialized Installation Administration, supervised by meritorious builder of the RSFSR V. Kharitonov, called the brigade of I. Bokhonov from the Baltic SMU [construction and installation administration] to a competition. Both collectives pledged to complete the final work ahead of schedule and, having kept their word, contributed to timely turnover of the facility.

The Mazheykyay workers gratefully acknowledge the cooperation with the Moscow workers, whose experience helped to solve complicated production problems. Brigade leader V. Kharitonov has given more than 40 years to his occupation. The list of his construction projects include KamAZ [Kama Automotive Plant] and large petrochemical facilities at Moscow, Novocheboksarsk, Saratov and Ryazan. He has been awarded orders of the October Revolution and Red Banner of Labor. His brigade installed other equipment in the second unit of the petroleum refining plant, besides the gas fractionation plant. A. Gudkov, V. Areshkin, A. Pushkin, I. Ponomarev and other installers also worked excellently at Mazheykyay.



"We will not say goodbye to our Mazheykyay friends but would only say 'so long' to them. Construction of a complicated petroleum refining complex, which as yet has no analog in the country, will begin here in the future. Incidentally, our brigade will participate in construction of it since we have experience. And if it is required, we are ready to assist the Mazheykyay workers again," V. Kharitonov said upon departing.

The brigade of A. Gedminas from the First Mazheykyay Construction Administration and also the installers of the automated control and electrical systems of Sevzapmontazavtomatika and Sevzapelektromontazh Trusts, supervised by A. Stanis and M. Grigor'yev, starting adjusters Z. Beskrovnaya, S. Bychkov and G. Glovatskikh and other specialists worked well in construction of the gas fractionation plant.

By putting the gas fractionation plant into operation on time, the builders and operators have adopted a pledge to bring it to design capacity by 27 May--Chemist's Day.

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## OIL AND GAS

### POOR-GRADE FUEL, LOW SUPPLY DISAFFECTS INDUSTRY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Apr 84 p 1

[Article by A. Bondarev, deputy chief of Fuel and Petroleum Management Administration of USSR State Committee for Supply of Production Equipment for Agriculture]

[Text] The stamp "sowing campaign" now stands on the freight documents that accompany the gasoline and diesel fuel tanks intended for the country's agricultural regions. Their movement from the filling stations to the oil depots is monitored and accounting for the arrival of petroleum products at the depots has been organized. An operational headquarters with the participation of the managers of Minsel'khoz [Ministry of Agriculture], Goskomsel'khoshtekhnika and USSR Goskumnefteprodukt [State Committee for Supply of Petroleum Products] is meeting weekly. Maintenance and refuelling of the vehicles directly in the field has been organized.

The fuel reserves in the tanks of most of the rural petroleum depots permit the machine operators to work in the planting campaign at a good rate. However, according to data coming from local sources, they have decreased appreciably during the first half of April.

This was caused by unsatisfactory fulfillment of the plans for deliveries of petroleum products. Since the beginning of the year, the enterprises of USSR Minneftekhimprom [Ministry of the Petroleum Refining and Petrochemical Industry] has become indebted to the rural users for hundreds of thousands of tons of motor gasoline, a large amount of diesel oils, including that for modern energy-saturated tractors. The shortage of petroleum products on many farms of Kazakhstan, Uzbekistan, Kirgiziya and Tadzhikistan, where spring field operations are in full swing, is especially alarming.

The delivery of diesel fuel to the countryside is proceeding on an advanced basis throughout the country as a whole. But there is still a shortage in some rayons that are planting. We are talking primarily about Belgorod, Kursk, Ulyanovsk, Tula, Smolensk and Amor Oblasts in the RSFSR and a number of oblasts in the Ukraine. It is obvious that Goskumnefteprodukt must show more initiative in distribution of available resources.

Also disturbing is the fact that the farms are not being provided with a complete variety of fuel and lubricants. There is not even the common grade

of A-76 gasoline on many kolkhozes and sovkhoses of Krasnodarskiy and Stavropolskiy Krays and in Rostov Oblast. It is difficult to find Litol-24 grease in the Tadzhik SSR and high-quality oils are unavailable in some rayons of the republic. Moreover, if one judges by the reports, all this is available in Tadzhikistan. But the scarce brands of oils have even been delivered in surplus to some rayons, while the machine operators have been forced to use substitutes in other rayons, which frequently leads to idleness of the machines.

The unrhythmic delivery of railroad tank cars aggravates the "interruptions" of distribution. The subdivisions of the Ministry of Railways are not providing timely transport of fuel from such filling stations as Sineglazovo, Omsk, Sokur, Volgograd, Nikolskoye, Lisichansk, Pavlodar and others. A total of 30-80 empty tank cars below the daily norm is being delivered here during these spring days. This threatens an interruption of fulfillment of the April schedule.

The decision of the summary department of the fuel and energy resources of USSR Gosplan about a sharp increase in 1984 of funds for low-grade boiler fuel (so-called "motorka") with a corresponding reduction of the funds for furnace fuel, adopted unilaterally, has caused valid complaints in the countryside. It was assumed in this case that "motorka" will replace furnace fuel in the heat generator plants and boiler plants, generating heat for the production and communal needs of agriculture.

However, it turned out otherwise. The low-grade fuel pouring into the farms in a broad stream, as tests showed, is unsuitable for these purposes because of the increased content of coking resins, ash, mechanical impurities and also the high congealing temperature. Therefore, diesel fuel, the resources of which are limited even without this, have begun to be used in some rayons to heat poultry factories and greenhouses.

The uninterrupted work of machines in the spring fields of course depends on economical use of fuel. The enterprises of Goskomsel'khoshtekhnika are adopting measures to improve the technical state of rural oil facilities, oil depots and refuelling stations. A large part of them now corresponds to modern requirements. The experience of creating large oil depots for agricultural equipment in the Ukraine, Belorussia, Armenia and Azerbaijan has justified itself. Petroleum products are arriving here in transit, without intermediate transshipments.

At the same time, there are still many serious deficiencies in storage and use of fuel in rural regions. As a check showed, there are numerous cases of overconsumption of gasoline and diesel fuel and accounting has not been organized everywhere. The managers of rayon departments of sel'khoshtekhnika should struggle more actively against waste locally and should put a reliable damper on losses.

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## OIL AND GAS

### REMOTE CONTROL MONITORS TYUMEN PIPELINES

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 28 Apr 84 p 1

[Article by M. Umanskiy: "One Trillion on the Account!"]

[Text] The workers of the Production Association Tyumentransgaz have shipped one trillion cubic meters of natural gas from the gas fields of Tyumen Oblast since the beginning of their operation.

"Tyumentransgaz consists of eight operating gas pipelines more than 12,000 kilometers long, through which more than one-third of all gas produced in the country is pumped," the chief engineer V. Kosachev in the central dispatcher association tells me. "These are tens of compressor stations that accelerate the flow of the gas rivers. The total capacity of our gas pumping units is approximately five million kilowatts, which exceeds the capacity of the Bratsk GES."

The gas flow can be controlled from here, from the central dispatcher room, on an operational basis by increasing or reducing the delivery of fuel to consumers. Computer hardware helps to do this, previously calculating tens of versions to provide reliable operation of the complicated system of gas pipelines. And what happens if something unprecedented occurs: a slide or let us say an earthquake damages the pipeline somewhere in the remote taiga? The repair brigade will stay at the site until the damage is repaired.

But such an almost improbable misfortune will not catch the gas transport workers by surprise.

A small ordinary key, lying in a transparent plastic box on a console, was shown to me at the Komsomol Compressor Station.

"This is the key of the remote control system," explained the chief of the compressor station S. Lynov. "If some unforeseen situation occurs, let us say, on the gas line, the sensors here send an alarm signal through the radio relay stations. In this case it is sufficient for the dispatcher to place the key in the necessary slot and to dial a specific code. Located tens of kilometers away, a multiton ball cock will cut off the flow through the pipe at the point of damage."

The gas river will not cease its travel for an instant. All seven of the pipelines coming from the north of the oblast are connected to each other by "reliability cross links." And if one or even more lines is cut off, the gas is simply detoured temporarily to another line. The industrial centers that use the valuable fuel will essentially experience no failure.

The gas workers of the Ukraine, Azerbaijan, Turkmeniya and the Orenburg area arrived at the Komsomol line production administration to maintain an honor watch, devoted to a significant event. There is something to gain from such Tyumen foremen as engineers of the production units, winner of the USSR State Prize V. Barulev, M. Pachenkov and V. Popov, senior dispatcher V. Ryasnov, fitter R. Agafonov and other leaders of the competition.

The collective of Tyumentransgaz Association has pledged this year to increase labor productivity by 1.1 percent above the plan and to additionally reduce the cost of gas transport by 0.6 percent. It is firmly keeping its word.

By the end of the day, the chief dispatcher Yu. Buturlakin had entered a one with twelve zeros in the log. Tyumentransgaz had opened the account to the second trillion cubic meters of Siberian gas.

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## OIL AND GAS

### UNEARNED BONUSES AT SURGUT ADMINISTRATION CRITICIZED

Moscow SOVETSKAYA ROSSIYA in Russian 6 May 84 p 13

[Article by Kh. Sayfullin, Surgut Administration Vostokburvod: "They Have Legalized the Addition"]

[Text] The special trust Vostokburvod has been created at Minmontazhspetsstroy [Ministry of Special Installation and Construction Work] for drilling water wells for technical needs and the population. And here is the amazing thing. These wells were simply gold mines and provide the workers of the trust with tens of thousands of rubles in the form of bonuses which are unearned.

This is being done by means of sly manipulation of design-estimate documentation. For example, machine tools and equipment are powered by electricity from a unified system, but the rates which are used when working with a diesel drive are embedded in the estimates. The cost of a meter of drilling is increased 3-4-fold in similar fashion. The rotary turbodrill method of drilling is used, while the more laborious rotary drill string method is used for the estimate. It provides a considerable increase of the rates for the item "wage and operation of mechanisms."

As a result, the Surgut administration of the Vostokburvod Trust uses the same equipment as the oil workers, but the water wells drilled last, are estimated at 2-3-fold less expensive. The Surgut administration has now conducted a single financial-estimate operation: on paper the cost of drilling itself is half as much, while the remaining funds--several hundred thousand rubles from each well--were left for auxiliary and preparatory operations (development and filling in soil on the site for well "clusters"). This permits the trust to emerge in the role of general contractor and to sign documents as subcontractor for a very significant volume of operations on its own base.

Superprofits and conservation permit the drillers to receive significant quarterly bonuses. For introduction of each well seemingly ahead of schedule, the client--the Surgutneftegaz Association--accurately recalculates more than 30,000 rubles to Vostokburvod and almost half a million rubles annually. This sum is divided among the designers, the Surgut administration Vostokburvod, the trust managers and the clients.

Two years ago, the oblast newspaper TYUMENSKAYA PRAVDA wrote about the additions in drilling the wells, about the intentional exaggeration of their estimated cost and about the illegal bonuses. The article was discussed at an open party meeting of the Surgut administration Vostokburvod, at which were present the head of the department of construction and municipal economy of the CPSU Gorkom B. B. Povetin and the manager of the trust G. P. Kvashnin. Unfortunately, the party organization did not give principal evaluation to the facts outlined in the article. However, the manager of the trust G. P. Kvashnin mainly recognized the criticism as correct and promised to review the design-estimate documentation.

What has been done during these two years? Much. Primarily on the instructions of the same Kvashnin, the chief of the Surgut administration L. V. Goryayev solved some personnel problems." The people who washed their dirty linen in public--I. I. Zil'berman, A. A. Temeryuk, B. V. Pak, N. N. Farankova --a total of 16 people--were voluntarily transferred to other organizations at the request of the chief himself. And the trust then actually reviewed the documentation: it increased the cost of a well by one-third!

The Surgut administration is now headed by the former chief engineer V. F. Kupriyanov, the bonuses have become especially audacious and the premiums have increased sharply. This has generated an unhealthy atmosphere within the collective.

From time to time the administration calls for various types of departmental inspections. But the manager of the trust G. P. Kvashnin presents documentation to them that looks so favorable that the inspectors do not look for defects. Or perhaps they do not want to? The workers of the city party committee observe the events with amazing calm. It is hardly appropriate in the given situation.

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## OIL AND GAS

### STATE PRIZE WINNERS IN AZERBAIJAN PETROLEUM REFINING

Baku VYSHKA in Russian 27 Apr 84 p 1

[Article: "A Fruitful Union of Science and Industry"]

[Text] One of the sector's oldest industries of Azerbaijan--the petroleum refining industry--is entering its second childhood. The creative cooperation of scientists and producers made a decisive contribution to the rebirth of it. A group of scientists and specialists was awarded the USSR State Prize for 1983 in science and technology for development and introduction of control and information systems to increase the production efficiency of the petroleum refining industry of the Azerbaijan SSR..

The honorary awards were handed to the winners on 26 April in the club of the Novo-Baku Petroleum Refining Plant imeni Vladimir Il'ich in a solemn ceremony.

The scientific secretary of the Committee for Lenin and USSR State Prizes Professor V. N. Chetverikov made public the decree of awarding the USSR State Prize and warmly congratulated the winners of the award and wished them new success in the name of the flowering of the Soviet motherland.

Workers of the Azerbaijan Institute of Oil and Chemistry: rector, Academician of the Azerbaijan SSR Academy of Sciences I. A. Ibragimov, department head, Corresponding Member of the Azerbaijan SSR Academy of Sciences T. M. Aliyev, Doctor of Technical Sciences, Professor A. A. Ter-Khachaturov, senior instructor, Candidate of Technical Sciences V. P. Krivosheyev, Candidate of Technical Sciences, docent I. R. Efendiyev, rector of the Sumgait VTUZ, a branch of the Institute of Petroleum and Chemistry imeni M. Azizbekov, Doctor of Technical Sciences R. A. Aliyev, workers of NPNZ imeni Vladimir Il'ich [Novo-Baku Petroleum Plant imeni Vladimir Il'ich], director, Candidate of Chemical Sciences A. M. Guseynov, shop chief E. A. Guseynov and chief of the information computer center, Candidate of Technical Sciences A. A. Ismaylov received awards.

Comrade Bagirov, in the name of the Central Committee of the Azerbaijan Communist Party, the Presidium of the Supreme Soviet and of the government of the republic, warmly congratulated the winners of the USSR State Prize and in their name the entire multithousand collective of scientists and specialists of the republic with the important and merited award and wished them new success in labor for the good of our motherland, strong health and much personal happiness.



At the modern stage of socioeconomic development of the country, he said, the party and government are allocating a leading role to acceleration of the rates of scientific and technical progress, to the most rapid introduction of the advances of science into the national economy. Important work is being conducted in this direction in our republic. One can say with confidence that a further increase of the effectiveness and quality of scientific research, introduction of progressive technology and techniques in production have become one of the decisive factors for the dynamic and forward development of the economy of Soviet Azerbaijan during the 1970s and 1980s.

Having noted that the material and technical base of all sectors of the Azerbaijan economy was strengthened significantly during these years, Comrade Bagirov emphasized that the advances of scientific and technical progress are reflected especially clearly in development of the republic's petroleum refining and petrochemical industry. The large-scale program for technical re-equipping of the petroleum refining sector made it possible to raise it to the level of modern requirements. Highly automated complexes for primary distillation of oil, catalytic reforming, hydraulic purification and deparaffinization of oils and so on have become operational.

Putting these complexes into operation with a high level of technical equipping required development and extensive introduction of control and information systems designed to improve the scheduling and coordination of the operation of the enterprises of the petroleum refining sector, improvement of monitoring and accounting, intensification of production processes and an increase of the efficiency of production and the quality of products produced.

The scientists of the Azerbaijan Institute of Petroleum and Chemistry imeni M. Azizbekov, of the Sumgait NIIPI [Scientific Research and Planning Institute] Neftekhimavtomat and specialists of the NBNZ imeni Vladimir Il'ich have concentrated their efforts in this very direction. The close cooperation of science and practice permits successful solution of the problem of acceleration in introduction of the advances of science into industry. The result of this union was that NBNZ has now become a model automated enterprise and the real flagship of the petroleum refining and petrochemical sector of the republic.

Scientific and technical progress, said K. M. Bagirov, turning to the workers of NBNZ, not only leads to an increase of production efficiency, but also to significant social transformations. The change of the face of your plant and of the nature of labor of the petroleum refiners clearly indicates this. You now manage highly automated modern production processes. The boundaries between physical and mental labor are clearly vanishing.

Talking about the important and crucial tasks faced by the scientists and producers of the republic, Comrade Bagirov emphasized that the effectiveness of scientific research in petroleum refining must also be constantly increased in the future and the output of petroleum products and universal conservation of fuel and energy resources must be increased. The experience that you have accumulated in automation of production processes in petroleum refining must be used in other sectors of the republic's industry to improve planning, management, monitoring and optimization of production.

New complexes to intensify refining of sulphurous oils, to increase the quality of produced fuels and oils and to develop large capacities for production of polymer materials and synthetic resins must be put into operation during the next few years in petroleum refining and petrochemistry. Successful implementation of the planned goals requires a further expansion of the integration of science and industry.

The main task of our scientists today includes sequential implementation of the decisions of the 26th CPSU Congress, of the April (1984) Plenum of the CPSU Central Committee, of the regulations and conclusions contained in the speeches of Comrade K. U. Chernenko on problems of increasing the effectiveness and quality of scientific research and concentration of it in acceleration of the solution of key problems of the country's socioeconomic development.

In conclusion, K. M. Bagirov expressed confidence that the scientists and workers of the republic will direct all their efforts and energy, skills and inspiration toward further intensification of social production, successful fulfillment of state plans and socialist pledges and will honorably meet the remarkable holiday of workers of the entire world--1 May--and the 64th anniversary of the founding of Soviet power in Azerbaijan. He again wished the winners of the USSR State Prizes further labor successes and creative inspiration for the good of our great socialist motherland.

Speaking in the name of the awardees, I. A. Ibragimov, R. A. Aliyev and E. A. Guseynov expressed warm gratitude to the CPSU Central Committee and to the Soviet government for the high valuation of their activity and for the constant attention which is devoted to further development of the economy, science and culture. They stated that in the future they will give all their efforts, knowledge and inspiration in the service of the Soviet fatherland and will contribute to implementation of the historical plans of Lenin's party.

Comrades V. N. Konovalov, R. E. Mekhtiyev, G. N. Seidov and S. B. Tatliyev, deputy chairman of the Council of Ministers of the Azerbaijan SSR F. G. Akhmedov and department heads of the Central Committee of the Azerbaijan Communist Party R. D. Mamedov and N. S. Sadyk-zade were present at the awards.

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## OIL AND GAS

### GEOPHYSICAL OPERATIONS IN SIBERIA

Moscow IZVESTIYA in Russian 5 Apr 84 p 2

[Article by Yu. Kalinnikov, Nizhnevartovsk-Megion: "A Look Into the Earth's Depths"]

[Text] Precise three-dimensional models of the fields created by specialists of the Megionneftegeofizika Trust make it possible to increase production efficiency and to conduct it as if with open eyes.

The geophysicists are frequently called fortune tellers: there is no word "interior seers." But it would be more accurate. The seismic prospectors look for a field and determine its contours. Field geophysicists aim the shafts of the well. The most crucial phase then begins--the yield of the beds which they are tracking.

Siberian oil began here a little more than 12 years ago, at Megion. The name of Samatlor, followed by the Agansk, Varyegansk and Pokachev fields, resounded throughout the world. The geophysicists of this unique specialized trust in the country are monitoring development of them and tens of others. Their task is the same--to show the producers how to extract more valuable raw material from the interior.

"Instruments, for example, a pulsed neutron generator, based on the principles of nuclear physics, 'produce' it," relates the chief of the field geophysical party F. Kyshtymov. "They are sharply expanding our capabilities. Since the beginning of the five-year plan alone, the new technique has made it possible to increase labor productivity by 15 percent."

The Megion geophysicists are now "conducting" more than 3,000 shafts--they are mapping them in heat and cold, day and night. And each shaft is unique.

The shaft literally ate up the thermometer. The machines--the laboratory and the hoist--are nevertheless at the wellhead. The equipment is checked after long travel. Everything is in order. A brilliant two-meter needle is inserted into the sealed wellhead and a matte line is inserted behind it. These are instruments with a cable. They unwind more and more rapidly from the enormous winch of the hoist. They stop. They take measurements and stop again. Multiple examination of the well is completed only after 24 hours and the tables and diagrams become the "mirror" itself, which provides a complete picture of the oil horizon to chief geologist V. Telenkov.

"From the mosaic of data obtained from the wells," he says, "a three-dimensional picture of the field is drawn. One can ascertain visually where it is best to place the next drilling rigs and there are thousands of them. It is extremely important to know this to maintain the pressure, which otherwise must be raised artificially by pumping water or gas. We also recommend this when the gushers cease to flow."

Looking into the future, one of the most prominent physicists of modern times Academician Ya. B. Zel'dovich named geophysics among the sciences which determine the face of the 21st century.

These words have been confirmed here by current practice.

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## OIL AND GAS

### WORLDWIDE OIL AND GAS CONDENSATE PRODUCTION

Moscow EKONOMICHESKAYA GAZETA in Russian No 19, May 84 p 21

[Article: "Oil and Gas Condensate Production"]

[Text] Worldwide oil production (together with gas condensate production), which comprised 1.053 million tons in 1960, reached its highest level in 1979 --3.114 million tons, after which it has decreased for 5 years running. In 1983, it comprised 2.589 million tons, which is almost 2.5-fold higher than the 1960 level, but 17 percent below the 1979 level.

Oil production dropped to the greatest degree in the developed countries. As follows from the table, it comprised 1.185 million tons in 1983 compared to 1.613 million tons for 1980, that is, it was 33 percent less. This sharp decrease was caused mainly by the following factors: the total decrease of demand for energy in the capitalist world with regard to the routine economic crisis that developed in the early 1980s, reduction of oil imports by most capitalist countries due to an approximately twofold increase in the price of oil on the worldwide capitalist market during 1979-1980 and also the desire of industrially developed capitalist countries to reduce their dependence on oil imports from the developing countries with a simultaneous increase of oil production at existing fields of the west.

Oil production in the industrially developed capitalist countries during 1980-1983 increased from 630 to 660 million tons or by almost 5 percent. It increased to the greatest extent among European Common Market members from 89 to 124 million tons, or by almost 40 percent, mainly due to expansion of exploitation of the interior in the English sector of the North Sea. USA production increased by three million tons. On the other hand, it decreased by eight million tons in Canada.

Oil production in CEMA countries is increasing from year to year. It reached 634 million tons last year, which is almost four times the level of 1960. Oil production in CEMA countries is approaching the level of its production in all the industrially developed capitalist countries taken together. Oil production in the Soviet Union, which comprised 43 percent with respect to United States production in 1960, exceeded the American level by 44 percent by 1983.

Oil and Gas Condensate Production (million tons)

	1960	1980	1983
Worldwide total	1,053	2,974	2,589
Socialist countries	168	731	744
CEMA countries	162	620	634
among them:			
USSR	148	603	616
Rumania	12	12	12
China	5	106	106
Industrially developed capitalist countries	388	630	660
EOC countries	12	89	124
among them:			
Great Britain	--	79	110
West Germany	6	5	4
United States	348	424	427
Canada	26	70	62
Norway	--	25	30
Australia	--	19	18
Developing countries	497	1,613	1,185
OPEC countries	440	1,342	850
among them:			
Saudi Arabia	66	496	240
Iran	52	74	127
Venezuela	149	115	96
Indonesia	21	78	64
Nigeria	1	102	61
UAE	--	84	51
Libya	--	88	50
Kuwait	86	86	50
Iraq	47	130	43
Algeria	9	47	36
Mexico	14	97	130
Egypt	3	29	33
Argentina	9	25	25
India	0.5	9	23
Brazil	4	9	15
Syria	--	8	9

Note. The table was compiled from United Nations data and official statistical publications of individual countries.

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## OIL AND GAS

### OIL AND GAS PRODUCTION AT SHIRVAN

Baku VYSHKA in Russian 17 May 84 p 1

[Article by M. Melikov, senior geologist of third field of NGDU Shirvanneft':  
"The Reserves of Mishovdag"]

[Text] The oil workers of the third field of NGDU [oil- and gas-producing administration] Shirvanneft' successfully completed a month of work under the slogan "Above-plan production every day." They extracted more than 150 tons of liquid fuel from the interior above the plan in April. The tasks now faced by the Shirvan oil field workers are difficult. Not only must they cover the debt accumulated at the beginning of the year, but they must also increase the production of natural fuel in such an old field as Mishovdag. Our collective is one of the first at Shirvan to follow the patriotic call of the Baku oil workers--to increase the yield of the interior and to compete for daily above-plan production of oil and gas. After careful analysis of reserves and capabilities, they concluded that the level of organization and procedure at each job site must primarily be strengthened and the responsibility of each for the entrusted matter must be increased to increase the productivity of the wells to a higher level. They began with this. They introduced monitoring of the course and quality of performing each planned measure and increased the requirement of observation of the technological conditions of operation of the wells. At the same time, they opened the way for the initiative and enterprise of the brigades. There are four of them. Each develops its own section and seeks and suggests its own paths to achieve the best end results, being guided by coordination and support of the geological workers of the shop and administration. One month later they saw that their plans were valid. For example, the operators from the brigade of Musa Shakyarov, having adopted a pledge to achieve an increase of daily oil production by no less than 5 tons, began to be oriented toward conversion of depleted wells to the electric submersible pump method of operation. Three wells of the section were immediately equipped with electric pumps in April. Because of this alone, the leaders increased the daily yield of the interior by 9 tons. The collective of the first section of the field, which is managed by experienced foreman Rizvan Gashimov, solves the problem of increasing the yield of the beds in a different manner. They bet on shooting the existing horizons of the productive bed. One of these measures, carried out in well No. 450, provided an increase of oil production by 2 tons. The bottom zone of the well was successfully treated with a solvent in Gashimov's section, which made it possible to increase the oil permeability and this means production as well. The lower strata of the second horizon of the productive

bed are being opened to increase the oil yield. This work is being completed in well No. 228, where a discernible addition to the daily yield of fuel is expected from all data.

An effect is achieved immediately due to several measures in the section of foreman Arastun Aliyev. For example, the reserves of fuel were increased in well No. 280 after replacement of a low-power pumping jack for a more productive one. Production was increased in well No. 345 by flushing and in No. 402 by increasing the suspension of the shaft. Wells Nos. 338 and 358 were perforated together with the geophysicists.

The brigade of foreman Farkhad Gadzhiyev made an important contribution to the overall matter. More than 25 tons of pure oil were produced in operational well No. 559, which was converted to deep pump operation. The technological innovation of the specialists of AzNIPIneft' [Azerbaijani Scientific Research and Planning Institute for Oil and Gas Production] was tested for the first time at this facility, which made it possible to reduce the period of development of a well and to cover the water strata on a timely basis.

These and other geological measures and the intensive labor of the entire collective made it possible to increase the daily production of oil by an average of 5 tons in April. It is now important to consolidate the success of the month's shock watch and to maintain a businesslike attitude toward practical solution of problems to increase the oil potential of the field.

The speech of General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet Comrade K. U. Chernenko at a meeting with the workers of the Moscow Metallurgical Plant Serp i Molot aims us toward this. Konstantin Ustinovich noted correctly that the basis for all our success remains highly productive labor, personal responsibility of each one in development of production and initiative and flexibility in solution of economic problems. For us this is a specific combat program of actions. And we oil workers of Mishovdag, having organized more extensively the socialist competition under the slogan "Above-plan production every day," are attempting to achieve higher results on the basis of the maximum use of available reserves and to make the maximum contribution to implementation of the country's Energy Program. To do this, we plan to carry out additional geological and technical measures. The brigades of our field have given their word not to permit violations of labor and production discipline and to assist each other in overcoming the difficulties which arise in daily work.

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## OIL AND GAS

### INCREASED OIL AND GAS PRODUCTION IN CASPIAN

Baku VYSHKA in Russian 17 May 84 p 1

[Article by M. Salamov, oil and gas production foreman of NGDU imeni N. Narimanov: "Let's Produce More"]

[Text] Our field No. 1 knows no equal in the NGDU [Oil and Gas Production Administration] imeni N. Narimanov in the volume of oil and casing-head gas produced. Only the pool of the seventh horizon of the productive bed is being exploited in this section of the field, where the deepest wells are located.

Under these conditions, when the possibilities of an increase at the expense of other facilities are very limited, it is important to organize the work so that all the wells operate in a stable fashion and under optimal production conditions. We have no experience in this. Our brigade was awarded the second monetary premium of the Kasporneftegazprom Association last year for victory in the socialist competition.

How can we produce more? This is a very timely question for our brigade. The call of the Baku oil workers to organize the socialist competition on a wider basis to increase the yield of the interior has been accepted in a businesslike manner by each operator and specialist of our field. Having weighed our capabilities, the collective of the brigade pledged to produce 2,000 tons of oil and 1.5 million cubic meters of gas above the plan in 1984. Moreover, we decided to organize our own work so that each day would produce no less than half a ton of oil above the plan.

The thoughtful search for oil production reserves has now been organized in the section. Measures to prevent paraffin deposits in the lift pipes occupy an important position in this work. After all, any one of the operators can fail to see how paraffin clogs the pipes so much, and repair workers must be called to the well. But any shutdown of the wells causes additional concerns and expenditures of time and labor which can only result in a minus.

But this does not occur in our practice. Operators Akif Aliyev, Mubariz Magerramov, Chingiz Babayev, Radzhab Sadykhov and other members of the brigade display a conscientious attitude to the matter and comradely mutual assistance. This was manifested especially in January of this year when the high-pressure gas line in the field ruptured. The productivity of many wells decreased sharply and a shortfall occurred. The situation was exceptionally difficult,

but the people knew how to mobilize all their forces, to adjust the operation of the wells and the lag had completely been made up in March.

The first above-plan tons of oil have already been delivered to the reservoir tanks. Perforations of the filter provide us with a solid increase of fuel. For example, well No. 455 increased its yield by 30-35 tons of oil per day. Moreover, we expect to achieve an increase of 20 tons of oil from well No. 411, where it is planned jointly with the geological service of the field to increase the submersion of the lift pipes. It is planned to implement 18 technical measures before the end of the year, which, according to calculations, should provide an additional yield of fuel for our section.

Of course, we link fulfillment of the adopted pledges to shock work of the drillers from the Sangachalmubr [not further identified]. They should drill nine wells at our field this year, of which four are in our section. Putting them into operation will permit not only stabilization of production but will also provide an increase of it by several hundred tons of oil per day.

Yes, the new wells are a reliable reserve. But this must be realized on an intelligent engineering and skillful basis. And the oil workers here are counting on the assistance of the shop workers of the scientific research and production work of our administration, who are involved in problems of efficient exploitation of the oil pool. Polymer materials and surfactants are being used successfully and new forcing wells are being introduced for effective progress in expulsion of the oil by water. In short, this work must be carried out so that the water action in no way have a negative effect on the yields of the wells.

The brigades of foremen Shirmamed Safarov, Veli Mustafayev, Il'gar Abdullayev and Azizagi Azizov, competing with this, have been included in the competition under the slogan "Above-plan oil every day." They also planned high positions and are now struggling persistently to implement them.

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## OIL AND GAS

### BRIEFS

**AZERBAIJAN OIL PRODUCTION--Azerinform--**The exercises of the All-Union School Seminar at the Institute of Problems of Deep Oil and Gas Fields, Azerbaijan SSR Academy of Sciences, were devoted to forecasting the geological and economic quality of hydrocarbon resources. The scientific councils of the USSR Academy of Sciences on the problems of oil and gas geology and geochemistry and on the problems of exploitation of oil fields organized it. Among the participants were scientists, specialists of academic and sector scientific research institutes and producers. The chairman of the scientific council of the USSR Academy of Sciences on problems of exploitation of oil fields Academician of the Azerbaijan SSR Academy of Sciences M. T. Abasov, corresponding member of the USSR Academy of Sciences V. D. Nalivkin, Professor N. A. Krylov and other scientists that head scientific research in the country on the problems under discussion gave talks to the students. They discussed the current state of the problem of estimating the geological and economic quality of oil and gas resources. The prospects for development of fundamental and applied research, which is the basis of optimum planning of development of the USSR oil- and gas-producing industry, were analyzed. Methods of increasing the effectiveness of geological economic evaluation of the strategy of exploratory prospecting work for oil and gas in Azerbaijan were also noted. [Text] [Baku BAKINSKIY RABOCHIY in Russian 19 May 84 p 3] 6521

**INTRABED COMBUSTION--**Fire helps Baku oil workers to restore production from old wells of the oil- and gas-producing administration Leninneft'. They used the so-called method of intrabed combustion. These wells were regarded as unpromising until quite recently. Viscous oil remaining in the interior could not be forced out either with water or steam and the crude oil was not subject to the effects of surfactants. Specialists of the laboratory of intrabed combustion, created at the Azneft' Association, suggested that fire be ignited in the interior, which does not ignite the oil due to the small quantity of oxygen, but only liquefies it and makes it suitable for transport. The expenditure for construction of a compressor station and laying of more than 20 kilometers of pipelines were justified: the wells have again become gushers. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 24 Jun '84 p 1] 6521

**SOCIALIST COMPETITION WINNERS--Azerinform--**According to the results of the All-Union socialist competition, the honorary rank of "Best drilling brigade of the Ministry of the Petroleum Industry" was awarded to the collective headed by Hero of Socialist Labor, deputy to the Azerbaijan SSR Supreme Soviet

Akif Amanov from the Ali-Bayramly Administration of Drilling Operations. The leading brigade drilled five wells last year and they all became operational ahead of schedule. The brigade of drillers of Sarkhosh Mamedov from the Kyursanginskiy Administration of Drilling Operations was also awarded this high rank. The collective Rasim Ragimov from the second field of NGDU [Oil and Gas Production Administration] Karadagneft' were recognized as the best in the sector among the oil-producing brigades. The brigade of Surakhan foreman Taptyg Shirinov, who was also awarded the rank of best in the sector, was distinguished among the drillers of the Azneft' Association. [Text] [Baku VYSHKA in Russian 16 Mar 84 p 2] 6521

OFFSHORE DRILLING--An offshore platform foundation construction plant, the country's prototype is being constructed at Baku. It will be fully operational during the current five-year plan. Construction and the starting deadlines are provided by the decisions of the 26th CPSU Congress. The product of the plant--steel islands weighing almost 20,000 tons--will make it possible to expand the oil fields on the continental shelf of the Caspian Sea. The territory of the enterprise occupies 200 hectares of land and sea. Installation of the first deep water platform has already begun on a free site near the edge of the pier. Tens of the country's enterprises are participating in the construction. The main building, where the metal is laid out, is now operating at the plant. The pipes from which the islands are assembled are also manufactured here. [Text] [Baku VYSHKA in Russian 26 Jun 84 p 2] 6521

TYUMEN DRILLING--Preparation for drilling a deep test hole in Western Siberia has begun. Its location has already been determined--not far from the Urengoy gas condensate field. The drilling will proceed into untouched beds to eight kilometers. Drilling the well, which exceeds 3-4-fold the usual operating parameters, requires great attention and efforts. A special subdivision is being created at Glavtyumengeologii [not further identified], which will be entrusted with this serious matter. Unique equipment which made it possible to reach 15 kilometers, is being prepared at Uralmash [Urals Heavy Machine Building Plant imeni Sergo Ordzhonikidze]. An extensive scientific program, the goal of which is to investigate the laws of formation of ancient rock and to determine the prospects of deep oil and gas horizons, has been developed and confirmed at ZapsibNIGNI Institute [possibly West Siberian Scientific Institute for Oil and Gas Research]. [Text] [Moscow IZVESTIYA in Russian 17 May 84 p1] 6521

MANGYSHLAK OIL PRODUCTION--Shevchenko--The oil workers of Mangyshlak are increasing their oil production. It has increased by one million tons annually due to the use of chemical reagents alone. Nature has made it difficult to extract the raw material on the eastern coast of the Caspian: paraffin clogs the underground flows and pipes and the metal rusts rapidly due to the ground waters, supersaturated with salt. Traditional methods of treating the wells with hot water or steam were ineffective and the yield of the oil shafts decreased rapidly and equipment failed in the fields. The field workers turned to Kazan to chemical specialists for assistance. The scientists selected effective reagents, for manufacture of which the wastes of Mangyshlak chemical plants are suitable. Stationary and mobile proportioning units were developed within a short period and chemical treatment operators were trained. And the result is that the mean cycles between repair periods of the wells have been doubled and thousands of tons of metal have been conserved. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 26 May 84 p 2] 6521

VAT-YEGANSK OIL FIELD--Kogalym, Tyumen Oblast (TASS)--Development of Western Siberia's new Vat-Yegansk oil field has begun. The honorary right to drill the first well was entrusted to the brigade of Foreman A. Firkhov. This collective has been a participant in development of many oil pools in the Tyumen Arctic. Its wells produce tens of thousands of tons of valuable raw material daily at Samotlor alone. A. Firkhov himself has spent 11 years in Western Siberia. He began as assistant driller and has now become one of the most highly skilled specialists. The accumulated experience helps the drillers to construct the underground shafts at accelerated rates. The country will receive the first industrial oil from Vat-Yegan this year. [Text] [Moscow IZVESTIYA in Russian 24 May 84 p 1] 6521

UCH-ADZHI FIELD--(TASS)--The Uch-Adzhi field in the Central Kara Kumy (Turkmen SSR) has become operational. Its capacity is several billion cubic meters of gas annually. Approximately 20 large gas-producing fields are operating in Turkmeniya. It is planned to bring extraction of raw material up to 81-83 billion cubic meters annually by the end of the five-year plan. [Text] [Moscow PRAVDA in Russian 6 Jun 84 p 2] 6521

EXPLORATORY DRILLING--The drilling brigades of MURB [exploratory offshore drilling administration] Bukhta Il'ich, headed communists M. Aliyev and G. Isayev, who are supervising inclined drilling of wells from the second platform imeni 28 April, have achieved considerable success. Utilizing the new technique extensively, progressive technology and leading experience, they have drilled 17,485 meters of rock under the Caspian since the beginning of the five-year plan compared to a planned 17,186 meters for 4 years. A total of 299 meters of rock has been drilled on the 1985 account. Construction of three high-yield oil wells approximately 3,300 meters deep each has been completed. The leaders have now begun drilling the fourth well with a planned depth of 3,500 meters and have brought the bit to a depth of 570 meters within 6 days. This success is the result of the solidarity of the members of the brigade, assimilation of two or three related occupations by each of them and high labor and production discipline. The watches of drillers Namik Akhundov and Valentin Khlebnikov and assistant drillers Fikret Abbasov and Abdulla Sadykhov lead in the socialist competition between shifts. They are fulfilling their shift tasks by 130-140 percent. Having reviewed its plans and capabilities, the collective took on a more intensive pledge: to complete the annual task by 7 November 1984, to complete well No 106 with high quality and 2 months ahead of schedule and to conserve more than 100,000 rubles on it. [Text] [Baku VYSHKA in Russian 13 May 84 p 1] 6521

OFFSHORE OIL PRODUCTION--Oil wells drilled from a platform installed at field imeni 28 April (Azerbaijan SSR) have become the most productive wells in the history of Caspian oil production. The sixth of 12 planned wells has been turned over for operation ahead of schedule. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 21, May 84 p 3] 6521

ORENBURG GAS PRODUCTION--The collective of the Orenburg Gas Refining Plant is working on a shock schedule. It has dispatched 500 million cubic meters of dry gas and 14,000 tons of elementary sulphur to consumers since the beginning of this year. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 23 Jun 84 p 1] 6521

URENGOY-CENTER-2 GAS PIPELINE--Svenigovo--The first kilometer of pipe at the Mari section of the Urengoy-Center-2 gas pipeline was welded into the string yesterday 2 months ahead of schedule. The integrated brigade of N. Kurbangaleyev was able to begin work on the new facility ahead of schedule due to completion of construction of the line part of the Urengoy-Center-1 main pipeline in the Mari ASSR ahead of schedule. The collective is working with great enthusiasm on the new run, welding 350 meters of pipe per shift. It was difficult to achieve this rhythm--the main pipeline was laid over swampy terrain with sharp drops of heights. Having entered a labor watch in honor of the 40th anniversary of victory of the Soviet people during World War II, the brigade of N. Kurbangaleyev pledged to weld pipe on the segment of the run from the Volga to Ilet'i ahead of schedule, by the beginning of August. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 22 Jun 84 p 1] 6521

URALS GAS PRODUCTION--Uralsk, 15 Jun 84 (TASS)--The everyday conveniences in the homes of the workers of sovkhos Iskra have been supplemented with gas burners. Tanks with liquefied fuel have begun to be delivered to the countryside and to the shepherd stations of the remote farm. Gasification of the populated points of the Kazakhstan Urals region completed this. Actively participating in implementation of the plans for improvement of the social and cultural conditions in the countryside, the Specialized Association Ural'-skoblgaz has increased the capacity of the gas delivery station 2.5-fold since the beginning of the five-year plan, compared to the planned capacity. Special tank delivery services have been created on all the farms. The highest level of gasification in Kazakhstan has been achieved in the oblast. Liquefied gas is delivered not only to all villages and auls, but also to temporary shepherd stations. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 16 Jun 84 p 2] 6521

LOK-BATANSK GAS--Azerinform--Five new wells with a total depth of more than 2,500 meters have begun to operate since the beginning of the year in the Lok-Batansk field of NGDU [Oil and Gas Production Administration] Karadagneft'. They were drilled by drilling collectives created at the capital repair shop of the administration, the best among which is headed by foreman Nasredin Adigezalov, rather than by specialists of drilling administrations. His brigade reported fulfillment of the plan 6 months ahead of schedule. Drilling is not an innovation to the members of this collective. They drilled small wells before during repair. However, in beginning their new duties, they had to organize deeper drilling, borrowing the experience of personnel specialists. Exercise at courses created at the administration helped in this. Specialized drilling brigades, which have turned over more than 20 wells for operation since the beginning of the year, have now been organized at all the NGDU of Azneft'. [Text] [Baku VYSHKA in Russian 20 Jun 84 p 1] 6521

TURKMEN GAS CONDENSATE--The Daulatabad gas condensate field in Southern Turkmeniya started permanent operation in January 1983. Another part of it--Sovetabad--was also prepared for assimilation. Six wells and plants for preparation, purification and drying of gas, through which approximately eight million cubic meters of deep fuel passes daily into the Central Asia-Center gas pipeline, are now operating at the Sovetabad field. [Text] [Moscow PRAVDA in Russian 24 Apr 84 p 1] 6521



VYBORG OFFSHORE DRILLING--There is perhaps no place at Vyborg where the reticular rig, crowned with a red flat, is not visible. A television tower? Ask arrivals. No, it is the Vyborg drilling rig, the residents of the city answer proudly. The construction of the semisubmerged floating drilling rig for offshore exploration of oil fields on the shelf is the main task of the workers of the Vyborg Shipyard. The height of "Shel'f" is 100 meters, the width is 64 meters and the length is 98 meters. It is equipped with everything necessary--from a helicopter to an underwater engineering diving complex. The rig can drill through 200 meters of water, while the depth of the wells will reach 6,000 meters. The time is near when the powerful rig, slowly separating the waters of the Baltic, will become operational. But Shel'f-4 must be tested before this. Electric welder Vasiliy Marshalkin, the winner of the plant and sector competitions of occupational skills and member of the plant Komsomol Committee, is well known at the plant. Vasiliy is one of the leaders of the shock watch in honor of the 60th anniversary of founding of the Komsomol imeni V. I. Lenin. [Text] [Moscow KOMSOMOL'SKAYA PRAVDA in Russian 6 Jun 84 p 1] 6521

VAT-YEGAN OIL FIELD--Development of Western Siberia's new Vat-Yegan oil field has begun. The honorary right to drill the first well was entrusted to the brigade of foreman A. Firkhov. The country will receive the first industrial oil from Vat-Yegan this year. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 23, Jun 84 p 6] 6521

OFFSHORE DRILLING AT VYBORG--Mooring tests of the pilot floating semisubmerged drilling rig, necessary to produce oil and gas in the shelf zone of the seas, have begun at the Vyborg Shipyard. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 25, Jun 84 p 3] 6521

ASTRAKHAN GAS CONDENSATE--The first operating well has been drilled at the Astrakhan gas condensate field. The bottom reaches 4,000 meters and a productive bed was begun at this depth. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 22, May 84 p 3] 6521

GAS PIPELINES--Perm--The main gas pipelines that began in the Tyumen Arctic extend for many hundreds of kilometers from the Urals ridge to the shores of the Kama River. The specialized service for gasification of rural populated points was created at the Permoblغاز Administration to accelerate the arrival of the blue fuel to the peasants' home. Approximately 100 apartments and buildings of the farmstead type have been connected and are being connected on the single sovkhos Mysovskiy alone to the main Nizhnyaya Tura-Perm-Gorkiy-Center gas pipeline, which begins in the well-known Medvezhe field in Tyumen Oblast. The plans of the Permoblغاز collective include delivery of gas through the main gas pipeline from the Urengoy field to the homes of residents of rayon centers of Orda, Berezovka, Oktyabrskoye and Bardy. Approximately 130,000 rural families now enjoy the gas in the Kama area. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 4 May 84 p 4] 6521

BRATSK GAS--(TASS)--Gas reserves have been discovered not far from Bratsk. Besides gas, the field contains a considerable amount of condensate. The forecasts of scientists that there are oil and gas in the interior of Eastern Siberia have been confirmed. However, exploration for them is made difficult by

the extensive depth of deposition. Thus, for example, a well almost four kilometers deep, revealing a productive bed, was drilled in the region of Bratsk. [Text] [Moscow IZVESTIYA in Russian 23 Apr 84 p 2] 6521

MANGYSHLAK OIL--Shevchenko--The oil workers of Mangyshlak are increasing oil production. They have increased production by one million tons annually due to the use of chemical reagents alone. Nature has made it difficult to extract raw material on the eastern coast of the Caspian. Traditional methods of treating the wells with hot water or steam were ineffective, the yield of the oil shafts decreased rapidly at the fields at equipment failed. The oil workers turned to Kazan to chemical specialists for assistance. The scientists selected effective reagents, for manufacture of which the wastes of chemical plants are suitable. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 26 May 84 p 1] 6521

CASPIAN OIL DRILLING--Baku--The brigade of drilling foreman Dashdamir Abdulrahmanov and Musa Sultanov of MURB [exploratory offshore drilling administration] Bakhta Il'ich have fulfilled the plan for 4 years of drilling wells. A total of 16,931 meters of rock have been drilled under the bottom of the Caspian compared to a planned 15,380 meters. A total of 1,500 meters goes to the 1985 account. Five wells on the Yuzhnaya, Ostrov Bulla and imeni 28 April platforms have been constructed successfully since the beginning of the five-year plan. It is gratifying that the last three wells--Nos 12, 17 and 103, drilled from separate deep water platform No 2, produced an abundant commercial influx of oil. The brigade has entered a competition to drill 10,000 meters annually and to turn over three operating wells. The watches of drillers Vasiliiy Timofeyev and Saryoglan Karibov and of assistant drillers Pasha Agayev and Ivan Sidorenko are laboring selflessly. They are fulfilling the shift tasks by 130 or more percent and have saved several hundred thousand rubles of state funds. [Text] [Baku VYSHKA in Russian 5 Jun 84 p 1] 6521

IRKUTSK CONFERENCE--Scientists, managers and specialists of the national economy have completed sectional discussions of problems within the framework of preparation for the regional scientific and practical conference, which will be devoted to the economic and social development of Irkutsk Oblast during the 12th Five-Year Plan and up to the year 2000. Special attention of the explorers of the interior was devoted to the Nepskoye dome uplift where promising oil reserves have been predicted. Thick deposits of potassium salts, which must be brought to industrial development, have been found here. [Text] [Moscow SOVETSKAYA ROSSIYA in Russian 12 May 84 p 2] 6521

EXCHANGE OF EXPERIENCE--The editorial board of SOTSIALISTICHESKAYA INDUSTRIYA, together with the Central Committee of the Azerbaijan Communist Party held a business meeting of Tyumen and Azerbaijan oil workers with machine builders of VPO [All-Union Production Association] Soyuzneftemash at Baku. The managers of the ministries of the petroleum industry, chemical and petroleum machine building industry, responsible workers of USSR Gosplan and directors of enterprises participated in it. The participants of the meeting familiarized themselves with the work of the Baku plants, which produce hardware for the oil workers, and visited the AzINmash Institute [Azerbaijan Scientific Research Institute of Petroleum Machine Building]. Timely problems of further development of petroleum machine building were discussed at the meeting. A detailed report of the meeting will be published in the near future. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 30 May 84 p 2] 6521



DIRECTIONAL WELLS--Novyy Urengoy, Tyumen Oblast--The Urengoy gas producers selected directional drilling as a method of controlling natural complexities. The deviation from the vertical reaches 400 meters. The drillers were forced to begin construction of such complicated underground shafts due to the dense swampiness of the terrain. A man-made island from which up to 12 wells in all directions can be carried out is initially filled in among the swamp. The wells are strengthened with additional accessories for stability and strength within the permafrost. This technique permits the gas producers to reduce the volumes of auxiliary operations to a great extent. [Text] [Moscow SEL'SKAYA ZHIZN' in Russian 18 May 84 p 1] 6521

OFFSHORE DRILLING--Neftyanyye Kamni--The oil workers, headed by foreman Gidayat Aliyev, accepted the next well on the field imeni 28 April from the offshore drillers. This promising field in the Caspian began to produce almost 5,000 tons of oil daily with introduction of it. A total of 10 wells is already operating, which were drilled from two platforms. The brigades of the Offshore Drilling Administration have drilled the first wells from a third platform. An accelerated assault on Caspian oil in this region of the sea, where the depth reaches 200 meters, will begin with complete introduction of the Baku Deepwater Foundations Plant. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 18 May 84 p 1] 6521

ORENBURG OIL PRODUCTION--27 May 84--Yet another type of product has appeared in the nomenclature of the Production Association Orenburggazzavod--oil. Oil

is frequently encountered on the fringes of the gas fields, but in small quantities. Little attention is usually paid to it. Specialists of the All-Union Industrial Association Orenburggazprom decided to change this situation. They worked out an introduced methods of producing this oil together with the gas condensate. Orenburggazdobycha Association has begun to send it from the fields to the gas plant for refining. A total of 100 tons of oil is delivered daily. Refining it is several times less expensive than would be necessary if special equipment were delivered. [Text] [Moscow PRAVDA in Russian 28 May 84 p 1] 6521

INCREASE OF OIL PRODUCTION--Bavly, Tatar ASSR--The oil workers of the oil- and gas-producing administration Bavlyneft' of the Tatneft' Association have produced more than 5,000 tons of oil above the plan since the beginning of the year. This is almost 1,500 tons more than the level of the above-plan production for this period of last year. The Bavly workers are confidently maintaining the level of production at fields which have been in operation for many decades. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 6 Jun 84 p 1] 6521

ASTRAKHAN GAS CONDENSATE--The first operational well has been drilled at the Astrakhan gas condensate field. The bottom was reached at 4,000 meters--a productive bed was begun at this depth--yesterday on the drilling rig where the brigade of V. Tokmilov of the Astrakhan'gazprom Administration is working. The drilling was completed ahead of schedule. [Text] [Moscow TRUD in Russian 17 May 84 p 1] 6521

BUZACHI OIL--Shevchenko--The collective of the oil- and gas-producing administration Komsomol'skneft' has provided accelerated rates of development of the oil fields of Buzachi Peninsula. The 50-thousandth ton of raw material above the plan has been shipped to the refining plants since the beginning of the year. The oil of the Karazhan Basin is deep. If traditional methods of extracting it are employed, nine-tenths of its reserves will remain under the ground. Therefore, the oil workers in cooperation with scientists are employing thermal methods of treating the pools. Powerful plants transform sea water to red hot steam and the steam is pumped into the interior. "We managed to prove the high efficiency of thermal methods of production," says the head of the scientific research department of VNIPI Termneft' [not further identified] N. Chervyakov. "Whereas the yield of one well was almost one-third during the year before introduction of the new technique, the productivity of the oil wells now even exceeds the initial level. The production factor of raw material will be increased during the next few years to 60 percent. This will be our contribution to solution of the task of efficient use of natural resources, posed in the speech of Comrade K. U. Chernenko at a meeting with the workers of the Serp i Molot Plant. [Text] [Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 11 May 84 p 2] 6521

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## COAL

### MINISTRY OFFICIAL EXPLAINS COAL-QUALITY DIFFICULTIES

Moscow AGITATOR in Russian No 15, Aug 84 pp 12-15

[Interview with First Deputy USSR Minister of Coal Industry Mikhail Ivanovich Shchadov by V. Filatov: "Coal: Variety and Quality"]

[Text] [Question] Mikhail Ivanovich, much is being written about the coal industry, but usually it is about the amount of fuel mined. And a year ago our magazine published the article, "More Coal for the Motherland!" But now this time, tell us, if possible, about the qualitative side of the matter.

[Answer] It is possible, and it is necessary. Nevertheless, to start with, let me say something about quantity. In the mining of coal, our country is in third place in the world, being somewhat behind the USA and China, but it surpasses by far the countries of Western Europe taken together. The USSR's share of world output is more than 16 percent, and our coal per capita is about 2.8-fold greater than the world average. But because of the depletion of old fields, it is becoming ever more difficult to increase output. Growth in output slowed during the last five-year plan and then stopped completely.

Meanwhile, the need for coal is increasing, particularly because of the adopted policy of decreasing the share of mazut in boiler and furnace fuel. Both the USSR Energy Program and current five-year plans call for growth in mining. Coal is needed for power engineering, metallurgy, district heating of cities and, yes, also for export. It is needed, but it still is not being provided, for which our industry was criticized strongly and correctly at the USSR Supreme Soviet session of December last year. It was noted then that, despite the great material and financial assistance of the state, many of the ministry's enterprises did not meet the goals for growth in labor productivity and delivery of output to customers.

Minugleprom [Ministry of Coal Industry], party organizations and the industry's working collectives have studied the criticism and are answering it with deeds. True, it is still too early to speak about a radical change: much work still remains to be done to this end. But on the credit side, according to the results of recent months, are several million tons of coal above the plan, something that has not happened for a long time. Coal-machinebuilding output increased 5-fold in volume. For the ministry as a whole, in the first 5 months of the year above-plan labor productivity growth rose 1.1 percent over the same period of last year, and production costs were reduced by 0.7 percent.

It is important not to waste these achievements by the end of the year but to meet the goals and socialist commitments successfully.

[Question] And how are things going with the assortment of coal?

[Answer] Officially, this term is not used at all in the industry, but let us accept it for the reader's sake. The fact is that the coal assortment is very broad. Let us begin with the fact that about 23 percent of the mining was done for low-calorie brown coal, more than 77 percent for harder coal. The most valuable one--anthracite--was especially singled out here. Coal differs in grade and size.

Almost two-thirds of the coal consumed in the country is used for the centralized generation of electricity and heating. More than half of the district-heating stations operate precisely on coal. Without going into technical details, I will say that each TES, and even most boilerhouses, were not designed for just any coal but for a strictly defined type. When coal that differs markedly from what is required, regardless of whether it is better or worse, is received, customers experience serious difficulties and use it with less efficiency.

[Question] That means you are not allowed to fulfill the plan just in gross output, for the ministry as a whole?

[Answer] I am leading up to that. Each underground mine and each strip mine is obligated to observe planning discipline strictly, giving each day precisely the amount of its coal that is required by different specific customers. Incidentally, among them are millions of citizens who are not yet favored by the benefits of district heating. Each year more than 30 million tons of coal are sold to the populace, and indeed, fines are not suitable for house furnaces or for many boilerhouses: they need good lump coal or briquettes.

[Question] You still have not mentioned one large customer--

[Answer] The metallurgists, more particularly the byproduct-cokemakers. Yes, this is a complicated problem. Your readers know about it from the article by First Deputy Minister of Ferrous Metallurgy S. V. Kolpakov that was published in issue No 13. I can add to what was said there, that about a fourth of the coal goes to cokemaking, including all the so-called caking-coal grades. But the trouble is that there are no longer large discovered reserves of these, they are in short supply. In the Donbass [Donets Coal Basin], they remain only at deep horizons, which have high temperatures and sudden gas outbursts, which are dangerous.

We are taking steps to increase the mining of caking coal. The construction of new and the rebuilding of existing underground mines where there are such reserves is planned. But these measures do not suffice by far. It is necessary to change the very technology for producing coke, to increase the share of the more plentiful gas coals and poorly caking coals, and to introduce progressive and economical methods into byproduct cokemaking. For example, thermal preparation of the coal blend increases coke output by 4-6 percent, improves its quality, and, finally, increases coke-battery production 30-40 percent. It was also correctly noted that savings of coke during the

blast-furnace process can and must be intensified. In brief, the coke problem must be resolved by the joint efforts of miners and metallurgists.

[Question] Now tell us, please, about coal quality.

[Answer] Our branch is probably the only one in industry where output quality as a whole has been falling for a number of years. Here are the data on this matter: from 1960 to 1983 mined coal increased by 40 percent in physical weight, but by only an estimated 28 percent in terms of standard fuel equivalent, that is, in real usefulness; since 1970 the figures have been, respectively, 15 percent and 11 percent less. The gap, as you see, is enormous.

The primary cause of this is the deterioration of the geological conditions for mining. Many of the deposits that are good from all points of view have been exhausted, and we have to take coal of lower calorie content, and, what is worse, coal that lies alternately with rock, and future siftings. The second cause is the introduction of highly productive machinery. A miner with a jackhammer saw where the coal was, where the rock was. But today, cutter-loaders in underground mines and rotary excavators at strip mines, operating at enormous speeds, take everything in turn.

It stands to reason that the clock of progress must not be turned back. Machinery and technology must be improved, in order to send less rock to the top. In particular, underground mines are increasingly being equipped with new mechanized longwall mining machines which, by the end of the century, it is estimated, will completely exclude the mining of coal from faces where country rock is cut into. The number of developmental faces with combined excavating and transporting of coal and rock is being reduced. Good results are expected also from the method of reinforcement of unstable roofs by direct injection of chemical binding compounds into the rock that has been developed.

And the third cause of the large share of rock in the coal and, accordingly, of its high ash content is the fact that at many underground mines, especially of the Selidovugol', Donbassantratsit, Krasnoarmeyskugol' and Dobropol'yeugol' Associations, operating discipline is being violated in the striving to lighten and to accelerate the work. Here also deviations from the procedure established for working seams, excessive cutting into country rock, and slow mastery of shearing installations, which allow coal to be excavated from thin seams without such cutting.... All miners must recognize the impermissibility of disregarding quality of the coal, contaminating it with useless rock and violating state standards. Political-agitation activists can and should help people to become aware of this.

[Question] You mentioned the standards for coal. What do they call for?

[Answer] The requirements for quality in coking coal, steam coal, household coal, and so on are differentiated by basin in the standards. In so doing, the maximum permissible percent content of ash, moisture and sulfur is indicated. All this is very important for customers. For example, reduction of ash content in steam coal reduces coal consumption at power stations, and the use of graded coal instead of run-of-mine coal for municipal and household needs also saves much fuel. Moreover, a reduction in the coal's ash and moisture content reduces the useless expenditures on hauling, respectively, rock and water.

[Question] And what kind of economic incentives are operating here?

[Answer] Extremely substantial ones. For each percent of reduction or increase in the ash content versus the standards, the wholesale price is to be increased or reduced, respectively, by 2.5 percent. We calculated, and it turned out that, for the ministry as a whole, a reduction of only about 0.1 percent in the ash content of coal that is shipped would give the branch a winning of 25-27 million rubles per year. And indeed a portion of this winning would go into the economic incentive funds of associations and enterprises.

And the pay system motivates people to raise output quality. Bonuses paid to workers of all trades connected with the mining and processing of coal for fulfillment of the production plan can be increased or decreased by as much as 25 percent, depending upon observance of the quality norms for coal that is shipped. Let us say that recently the bonus to the collective of a breakage face of the Sokolovskaya Underground Mine of the Rostovugol' Association was increased by four and a half thousand rubles for high quality of the coal. Moreover, observance of the ash-content norms is one of the main indicators in determining socialist competition winners among the industry's collectives.

Many collectives are coping successfully with the quality goals. But not all of them by far. Thus, last year Ukrainian associations paid in all 665,000 rubles in penalties for delivering coal that deviated from the standards. Recently the Yuzhkuzbassugol' Association had to pay a penalty. It had shipped to the Zaporozhye Byproduct-Coke Plant more than 60 carloads of coal that deviated from the GOST [State All-Union Standard].

There have been many complaints about the high ash content of coal that has been arriving at power stations, which, because the fuel is poor, have had to overconsume it and also to stop the equipment for repair more frequently than is prescribed. In brief, much had to be done in the industry to tighten up things and to strengthen plan and contract discipline. The collective of the Strip Mine imeni 50-Letiya Oktyabrya in Kemerovo Oblast adopted good commitments to this end. Among other things, it undertook to reduce the ash content of coal shipped by 0.1 percent below the planned amount.

More than half of the coal is processed at preparation plants. There are 147 of them in our ministry's system, and the metallurgists also have them. These are large, high mechanized and also, to a great extent, automated enterprises. Applying various mechanical, hydraulic, pneumatic and other methods here, the coal mass is freed of foreign matter and is graded according to size, and rock, sulfur and other impurities are removed from it, producing coal concentrate, which is convenient and economical to haul and to consume. At some preparation plants, coal briquettes also are made.

The volume of this processing is growing steadily. Fifteen preparation plants (Kalininskaya in the Donbass, Sibir' and Abashevskaya in the Kuzbass [Kuznetsk Coal Basin], the Preparation Plant imeni 60-Letiya USSR in Rostov Oblast, and others) are producing concentrate that has been awarded the State Emblem of Quality. But along with this, there are many plants that are poorly mastering capacity and are failing to meet the goals. The Kemerovougol' Association,

while fulfilling the mining plan overall for the past 3 years, has not once coped with the plan for output of graded coal. At the same time, last year, for example, more than half of the 10 preparation and grading plants at strip mines here were operating poorly and did not fulfill the plan. A similar situation also prevailed at Kuzbassugol' Association enterprises. Those guilty have been severely punished, and measures have been taken to improve the work in the Kuzbass and other basins.

[Question] And a last question. The country will observe the 50th anniversary of the Stakhanovite movement next year...

[Answer] ...which was born precisely within our branch. In continuing the Stakhanovite tradition, leading underground mining collectives already today are seeking out additional reserves for increasing production and raising its effectiveness and are making commitments to carry out five-year plan tasks for the glorious anniversary.

Among the first to undertake such a commitment were workers of the Torezskoye Underground-Mine Administration, where Aleksey Grigor'yevich Stakhanov worked for many years. I note that among their itemized commitments there is one that concerns a reduction in the coal's ash content by 0.2 percent. The competition for a worthy greeting for the anniversary is gathering strength. Collectives of the Underground Mine Severnaya and the Sibir' Preparation Plant, the Underground Mine imeni T. Kuzembayev in the Karaganda Basin, the Underground Mine Vorgashorskaya in the Pechora Basin, the Strip Mine Cheremkhovskiy in the Irkutsk Basin, and the Underground Mine Sokol'nicheskaya and the Strip Mine Ushakovskiy in the Moscow Basin have come out as the initiators of competition....

Finally, adopting good commitments is not even a half measure, it is only the beginning of it. They must be carried out successfully everywhere, by improving the use of equipment, introducing advanced work-organization methods, strengthening plan, labor and operating discipline, promoting active competition in collectives, working with zest and fervently, and boldly assaulting records, as Stakhanov did. Much will depend here upon the combat spirit of party organizations of the industry's enterprises, and, therefore, also on the work of their agitator activists.

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## NUCLEAR POWER

### INTERATOMENERGO CHIEF ON NUCLEAR INDUSTRY COOPERATION

Moscow APN DAILY REVIEW in English 18 Oct 84 pp 1-5

[Article by F. Ovchinnikov, director general of Interatomenergo, Hero of Socialist Labor, Merited Power Industry Worker of the USSR: "Nuclear Power Industry and Cooperation"]

[Text] Interatomenergo is a CMEA economic agency set up in 1973 by eight sponsor-countries: Bulgaria, Hungary, the DDR, Poland, Rumania, the Soviet Union, Czechoslovakia and Yugoslavia. Members of Interatomenergo are agencies, one for each sponsor-nation, which specialize in the production of equipment for the nuclear power industry or provide technical assistance in building nuclear power stations.

The agency focusses on economic cooperation and coordination of research, development and production in the nuclear power industry and the building of the appropriate equipment on the basis of the international socialist division of labour.

The world of socialism pioneered the use of the atom, a totally new source of energy, for the benefit of mankind. As distinguished from capitalism which first directed its nuclear research along the path of war and destruction, socialist society focussed on using it for peaceful purposes. This involved a good deal of sophisticated and costly research and design, as well as efforts to provide an industrial base for manufacturing all kinds of energy generating equipment, instruments and means of automation, and train manpower.

This year nuclear physicists around the world marked, together with the Soviet Union, the jubilee of the world's first nuclear power station put into operation in the USSR 30 years ago. Today the Soviet Union still leads the world in the production and operation of the biggest thermal slow energy generating units, as well as in the experimental industrial utilization of the biggest fast reactors.



## Mutual Help and Cooperation

True to its internationalist duty, the Soviet Union has always been selflessly sharing its experience and knowledge in the peaceful uses of the atom with the fraternal countries.

Thus in 1964 the Soviet Union put into operation its first 210-mw unit at the Novovoronezhskaya nuclear power plant, and two years later a similar nuclear reactor was built at the Rheinsberg nuclear power plant in the German Democratic Republic. In 1971 the USSR began operating a new generation of reactors of the VVER-440 type. Some time later similar units were supplied to the DDR, Bulgaria, Czechoslovakia and Hungary. The building of Soviet-assisted nuclear power plants in the above countries is still going on. Similar units are being built in Poland and Cuba. For several years now the Soviet Union has been putting to use new 1,000-mw units with the VVER-1000 reactors. Similar Soviet-designed units will be built in Bulgaria, the DDR, Czechoslovakia and other CMEA countries.

The aggregate installed capacity of Soviet-assisted nuclear power plants in the countries of the socialist community has reached 28 million kw to save over 60 million tons of fuel in terms of coal equivalent per annum. The nuclear power industry has already come to figure prominently in the fuel and energy balance of some socialist countries.

The Soviet-assisted nuclear power plants are extremely reliable and safe. So far no accidents have been registered to pollute the environment and expose the operation and maintenance staff to lethal doses of irradiation. The installed capacities' efficiency is within 75 to 80 per cent, higher than the efficiency of many foreign power plants and indicating to the skills of the operation and maintenance staff and the good quality of the equipment.

An intensive development of nuclear power plants in the fraternal countries compelled them to pool their efforts to advance the nuclear power industry on an international scale. To this end on June 28, 1979 the leaders of the CMEA countries signed an agreement on the multilateral international specialisation and cooperation of production and mutual deliveries of equipment for nuclear power plants for the period up till 1990. According to the agreement, the aggregate capacity of nuclear power plants in the CMEA countries is to reach 100 million kw. The parties to the agreement committed themselves to manufacturing over 140 items of the appropriate equipment and facilities. Scores of big enterprises in the countries concerned have been involved. To coordinate progress of work an intergovernmental commission was set up at the level of deputy heads of government.

In their bid to implement the 1979 agreement the CMEA countries had to expand contacts in the field of specialisation and cooperation of the production of equipment and spare parts for atomic power plants, start training and retraining operation and maintenance staffs, promote scientific and technical contacts to improve and develop new types of equipment and technological processes, develop and introduce a universal regulatory documentation

for manufacturing equipment, design, construction and operation for nuclear power plants, regularly exchange experience in machine building and operation of nuclear power plants. The above measures make the content of the multilateral cooperation between the sponsor-countries of Interatomenergo.

#### Long-Term Problems

On behalf of the intergovernmental commission Interatomenergo is responsible for the regular supervision over the manufacture and mutual deliveries of equipment and spare parts for nuclear power plants. The agency also advances proposals to expand specialisation, above all, in the manufacture of the equipment for used fuel depots and special accessories for safety regulation systems at nuclear power plants. It has already mapped out a programme for the centralized supply of spare parts to the stations.

A good deal of work has been done by Interatomenergo to improve the quality of equipment for nuclear power plants. The agency's specialists have been involved in drawing up programmes for the equipment's quality control. They have also developed and introduced general technical requirements for manufacturing accessories for nuclear power plants.

An international network is being set up to collect data on malfunctions exposed by the incoming control and during the assembly and operation of the equipment; if anything is wrong with the equipment, the manufacturers are immediately informed to be able to take the appropriate measure.

Interatomenergo is about to produce a universal regulatory documentation system to be used while manufacturing the equipment for nuclear power plants. The next step will be to develop a similar but larger-scale system to be used in all spheres of the nuclear power industry.

Within the next few years CMEA's nuclear power industry will be expected to depend on the VVER-1000 reactor designed in the Soviet Union. The CMEA countries will have to learn to operate nuclear power plants with such reactors and see to it that they are further improved. This is the purpose of an appropriate agreement translated into reality within the framework of CMEA standing commissions responsible for electric energy and peaceful uses of the atom. The agreement covers 32 subjects; Interatomenergo deals with 12 of them. One of the subjects, a joint venture undertaken by the Soviet Union, Czechoslovakia and Interatomenergo, which is nearing completion, involves the development of highly efficient filters for nuclear power plant ventilation.

One of the key issues facing Interatomenergo is a gradual transition to commercial accounting which would allow it to use to the utmost all the chances inherent in the development of the electric power industry.

Interatomenergo has largely promoted an exchange of experience in various spheres of the nuclear power industry, above all in the industrialization of the nuclear power plant construction, improving the maintenance of the stations and summing up the experience of their operation. Every year the

agency sponsors seminars for the CMEA countries and Yugoslavia to debate the most topical issues pertaining to the development of the nuclear power industry and nuclear mechanical engineering. The next such seminar will be held in Bulgaria in October 1984.

An effective form of cooperation in exchanging experience and advertising CMEA's achievements in advancing its nuclear power industry is Interatomenergo's regular involvement in major international fairs and exhibitions.

The decisions of the Moscow economic summit of the CMEA member countries pertaining to the fuel and energy problem provided a fresh impulse to the multilateral cooperation in the nuclear power industry.

A comprehensive programme devised jointly by the CMEA countries for the forthcoming 15 to 20 years lays a heavy emphasis on cooperation in the nuclear power industry so as to ensure its fast development and increasingly use it not only for electricity generation but also for heat supply.

The CMEA countries have agreed to develop a joint programme for the construction of nuclear electric power stations and heat supply power plants for the period up to the year 2000.

To cope with these and other problems Interatomenergo will have to further expand and improve its work, devising ever new methods and forms of multilateral cooperation.

(EKONOMICHESKAYA GAZETA No. 38--Abridged.)

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## NUCLEAR POWER

### USSR-BULGARIAN COOPERATION HIGHLIGHTED

Moscow FOREIGN TRADE in English No 7, Jul 84 p 16

[Text]

Soviet-Bulgarian economic and technical cooperation in atomic power is progressing successfully.

With Soviet technical assistance Bulgaria has built and put into operation two stages of the Kozloduy atomic power station (four power-generating units, 440,000 kW each). Since 1974 when the first power-generating unit was commissioned and up to 1983 the atomic power station has turned out about 64,000 million kWh of electricity. Its annual electricity output amounts to nearly 30 per cent of Bulgaria's total electric power production.

At present construction is under way of the Kozloduy power station's third stage. It will have two one million kW power-generating units. Last March, in Sofia, an intergovernmental agreement between the USSR and Bulgaria on economic and technical cooperation in constructing the Belene atomic power plant in Bulgaria was signed. This will comprise two generating units complete with VVER-1000 reactors and turbo-generators (unit power one million kW).

Ya.P. Ryabov, Chairman of the USSR State Committee for Foreign Economic Relations, and Kh. Khristov, Bulgaria's Minister of Foreign Trade, signed the Agreement.

Soviet organizations will design the project, supply equipment, render technical assistance during its assembly, put it into operation and train operating personnel.

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## GENERAL

### CMEA COOPERATION IN ENERGY RESOURCES EXAMINED

Moscow APN DAILY REVIEW in English 17 Oct 84 pp 1-5

[Article by G. Voskanyan and I. Motorin: "Key to Underground Treasure-Troves"]

[Text] Fuel and energy have grown to become the most important and complex problem of our time. Imperialist powers and their corporations are involved in a fierce struggle for raw materials and fuel and markets for these products. They mercilessly exploit the peoples of economically backward countries, plunder their mineral wealth. The imperialist powers regard fuel and raw material resources not only as the means of promoting production, but as the most important component of their military and economic potential and an important tool in dictating their will on others. It is not a mere coincidence that imperialist forces, and particularly those in the United States, have declared many regions rich in minerals zones of their vital interests.

In a socialist society this problem is handled on an essentially different basis, namely, on the principles of mutual advantage and all-round mutual assistance. The socialist countries possess vast reserves of practically all raw materials and fuels. They ensure the bulk of their requirements through mutual deliveries. The CMEA member-states produce and consume over a quarter of the world output of fuel and energy. They produce nearly 50 per cent more electricity than the Common Market countries.

The Soviet Union is a major producer and supplier of many kinds of fuel, energy and raw materials for the CMEA community. For many years now the Soviet Union has been supplying the CMEA countries with primaries in large quantities and at prices which enable the socialist countries to protect their economies against radical price fluctuations on fuel and raw material markets of the capitalist world.

The scale of Soviet assistance to the CMEA countries is evident from the following figures. With Soviet deliveries these states meet their import requirements for oil and oil products by 80 per cent; natural gas by 99 per cent, iron ore by 90 per cent; rock coal, manganese ore and cotton by more than 60 per cent; and rolled stock and phosphorus fertilisers by 75 per cent.

A new economic situation developed in the world economy at the end of the 1970s and beginning of the 1980s. The prices for primaries, particularly oil, on the world capitalist market, and their production and transportation costs soared.

In the socialist countries, an increasingly important role is played by factors which limit the possibility of increasing the volume of production and consumption of many minerals. Firstly, the consumption of minerals has grown immensely, as is confirmed by the following figures. In the past three years of the current Five-Year Plan period alone, the Soviet Union delivered to the socialist countries 264 million tons of oil and oil products, 92 billion cubic meters of natural gas, 53 billion kwh of electricity and 128 million tons of iron-containing raw materials.

It is worth mentioning here that the centre of the Soviet mining industry has been shifting eastward and northward, to underdeveloped regions with complex geological and natural conditions. This leads, naturally, to a considerable increase in the cost of production and transportation. It is obvious that the age of cheap raw materials and fuel has gone never to return. That is a matter of concern not just for importers of primaries, but for exporters of them, including the socialist states, as well.

In such a situation, the strategic programme to resolve the fuel and raw material problem developed by the CMEA economic summit for the forthcoming five-year plan period and to the end of the 20th century is of exceptional importance for dynamic economic development of the socialist countries. In view of the growing acuteness of the fuel and raw material problem worldwide, the conclusion made by the summit that the CMEA member-states can resolve their fuel and energy problem by pooling resources and intensifying cooperation is of truly historic significance.

The emphasis is on more thrifty use of national resources. Money spent on an economy programme is justified much quicker than investments in the mining industry. Priority has been given to a range of measures to ensure efficient and rational utilisation of all kinds of material resources through the introduction of progressive technologies, modern machinery and equipment and improvement in the production and consumption pattern.

The CMEA countries have accumulated a wealth of experience in thrifty use of primaries. This has been facilitated by national programmes of definite action. Economists have computed that through these programmes economies of energy resources in Bulgaria, Hungary, the GDR, Poland, the USSR and Czechoslovakia will exceed 250 million tons of conventional fuel in 1985 as against 1980. The recycling of secondary energy resources and the use of renewable energy resources, such as solar, wind and geothermal energy, also holds a promise of great savings.

The CMEA countries have also scored major successes in using recycled materials. The GDR, for instance, has accumulated a wealth of experience in this field. Today, the share of recycled materials amounts to 73 per cent in steel, 49 per cent in paper, 38 per cent in glass containers and over 20 per

cent in lubricants. The socialist countries generously share their experience in this field and give assistance in the practical applying of their advanced techniques.

Practical experience shows that maximum savings in material resources are possible only through concerted efforts by all interested parties. The CMEA Council is therefore developing a joint programme for thrifty and rational exploitation of fuel and raw materials to the year 2000. Its implementation will yield considerable economic benefits.

Of all the measures outlined by the CMEA Summit the most important is the development of nuclear power engineering. It is an important element in the CMEA countries' power industry. The CMEA members have developed a joint programme for the construction of nuclear power plants to 1990. So far nuclear power plants with an aggregate capacity of about 26 million kW have been built and started up. By 1990, their aggregate capacity will grow to 100 million kW. In many CMEA countries, any increment in power consumption in the 1980s will be achieved chiefly through nuclear energy.

The construction of nuclear power plants in the CMEA countries has been given a sound material and technical base. They have launched large-scale cooperation in the production of equipment and built new specialised capacities. Capitalising on the advantages offered by a large-scale international socialist division of labour close to 50 industrial associations and enterprises have been jointly producing equipment for nuclear power plants.

Thermal power engineering is another sphere of power engineering which consumes even more energy resources than electric power engineering. According to experts it uses up to 40 per cent of organic fuel. This industry also has considerable latent reserves for economies. The problem of their exploitation can be resolved through nuclear thermal engineering. Centralised thermal energy supply in the country's major cities and industrial centres through the construction and operation of nuclear heat and electric power plants is a fundamentally new concept in the use of nuclear fuel.

The CMEA summit took a resolution to elaborate a programme for construction of nuclear power and nuclear heat and electricity plants for the period to the end of this century. Its practical implementation will be an important contribution to resolving the fuel and energy problem in the CMEA member-states and ensure great savings of organic fuel. One million kilowatts of installed capacity at the nuclear power plants save over two million tons of conventional fuel a year.

The Soviet Union's contribution to the resolution of the fuel and energy problem will remain considerable. At the CMEA summit the Soviet delegation stated that the Soviet Union would continue delivering fuel and energy resources to the CMEA member-states. Moreover, it has plans to increase natural gas and electricity exports.

The summit planned for major projects to be built in the Soviet Union with the assistance of other CMEA countries, which will receive in return a part of the products of those installations. One of them is a powerful gas pipeline from Western Siberia which will have a capacity of 20-22 billion cubic meters of natural gas a year. This will mean a 70 per cent increase in Soviet gas exports to other CMEA countries.

Implementation of the fuel and energy programme developed by the CMEA summit will qualitatively improve cooperation between CMEA countries, and will enhance the economic potential and the might of the world socialist system.

(IZVESTIA, September 3, Abridged.)

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GENERAL

PROSPECTS FOR NATURAL GAS EXPORTS TO WEST EUROPE VIEWED

Moscow FOREIGN TRADE in English No 8, Aug 84 pp 28-32

[Article by Sergei Yuryev]

[Text]

For the industrial capitalist countries the past ten years have been marked by a severe energy crisis, which has demonstrated the extent of their present difficult energy problems and led to a marked deterioration of the conditions for the reproduction of social capital and an aggravation of the contradictions within the capitalist economy.

Power economy in the countries of Western Europe, one of the principal industrial centres and energy consumers in the world, has met with great trouble.

The raising of world prices for oil in 1973 and 1974 and the world economic crisis in the mid-1970s resulted in a 4.6 per cent decline in commercial energy consumption in 1975 in the region as compared with 1970. However, even in 1976 the record energy consumption level of 1973 (1,474 million tons of coal equivalent) was exceeded by two per cent.

Between 1960 and 1980 consumption of fuel and energy resources in the countries of the region nearly doubled, and in some of them the increase was even higher: in Austria—2.1-fold, in the Netherlands—3-fold, in Italy—3.5-fold, in Finland—3.6-fold, in Spain—4.1-fold. Thus the region's requirements for energy continue to grow, and despite the development of energy-saving technologies this process will continue in the future as well. The special energy-saving programmes that have been launched in several countries over the past 12 years have in the main only helped avoid excessive consumption of energy. A further reduction in the energy-intensity of the gross domestic product (GDP) may only be achieved by radically restructuring the technical base of the national energy balances and the entire energy-consuming system.

However, the high degree of the latter's orientation on oil and broad-scale energy consumption make such a restructuring extremely complicated and costly.

By the early 1980s, along with the extensive growth of energy consumption, considerable structural changes had occurred in the debit side of the energy balance of all West European countries, with coal being superseded by more effective types of fuel, above all, oil and gas, as well as atomic energy.

Between 1960 and 1980 the proportion of coal in the consumption structure of the West European countries' balance dropped from 67.3 per cent down to 24.7 per cent, while that of oil and gas together rose from 32 per cent to 70.1 per cent, including the increase in the proportion of gas from 2 per cent to 17.8 per cent.

During 1970-1980 alone the absolute volumes of gaseous fuel consumption went up by nearly 2.6 times, while the consumption of coal decreased 13.5 per cent. It should be noted that the above-said structural changes and growth rates of commercial energy consumption in the region were not accompanied by an adequate rise in the production of energy by national economies.

Apart from Great Britain, Norway and the Netherlands decline in hydrocarbons self-sufficiency in the region was observed by the 1980. For instance, the FRG could cover its needs for oil and gas from its own resources by only 4.2 per cent and 30.3 per cent respectively, France—2.6 and 29.9 per cent, Italy—2.2 and 47.2 per cent. The countries like Belgium, Finland and Portugal turned out to be fully dependent on oil and gas imports. What is more, oil and gas supplied the energy requirements of industry in the region by 43.0 and 19.6 per cent respectively, transport—97.9 and 0.2 per cent, the residential/commercial sector—46.6 and 24.6 per cent.

Compared with all the other types of fuel, natural gas as an energy substance has in a number of properties proved to be more preferable in the residential/commercial sector, as well as in many manufacturing industries (ferrous and non-ferrous metallurgy, the building materials industry, etc.). In 1982 natural gas consumption in the residential/commercial sector of the West European countries amounted to 112 million t.c.e., or 46 per cent of its total consumption.

Among the countries of the region where gas is mostly used in this sector are Great Britain, the Netherlands, Belgium and Italy.

The high density of urban construction and the actual

absence of centralized heat-supply systems is responsible for this sector's orientation precisely on this type of fuel. A substantial reduction in the consumption of natural gas during the next 20 years in the residential/commercial sector is therefore unlikely even in conditions of a rigorous energy saving measures drive.

Natural gas consumption in industry is also considerable. In 1982 West European industry consumed 75 million t.c.e. of gas, or 31 per cent of its total annual consumption. The proportion of natural gas in the pattern of industrial energy consumption was 20.4 per cent. Its proportion in energy consumption by this sector of the economy is now over 47 per cent in the Netherlands, 30 per cent in Great Britain, 25 per cent in Italy and Belgium, over 20 per cent in the FRG and France.

The largest gas quantities are used in ferrous and non-ferrous metallurgy and the chemical and metal-working industries. These are leading sectors in which the use of gas achieves a palpable rise in production efficiency.

That is why the requirements of West European industry for natural gas are quite stable. Whereas between 1979 and 1982 the total consumption of natural gas in the region fell by 8.6 per cent, the proportion consumed in industry fell only by 6.1 per cent.

The relative weight of natural gas in energy sector continues to be quite appreciable (25-45 per cent in the FRG and Finland). There is, however, a tendency to supersede it by coal, atomic energy and other new sources of energy.

In Western Europe as a whole the consumption of natural gas in electricity production in 1982 was 29.1 million t.c.e., a 12 per cent decline relating to 1981.

It is possible that the proportion of oil and gas in energy consumption by the leading sectors of the economy may lessen somewhat as a result of the measures to save energy and turn to other alternative energy sources.

Coal may take precedence in heat and electricity generation, but the decisive role of oil and gas in energy supplies for industry, transport and the residential/commercial sector will in the main continue in the next 20 years. Even if the proportion of oil and gas declines to 60 per cent in the latter sector, 50 per cent in industry and 80 per cent in transport, these sectors' needs for hydrocarbons by the year 2000 will have amounted to at least 1,150 to 1,300 million tons of coal equivalent, and this with due regard for their non-energy applications.

**Forecast of Hydrocarbon Consumption in West European Countries in the year 2000**

(mtn t.c.e.)

Consumer	Total energy consumption		Hydrocarbon consumption	
	High case	Low case	High case	Low case
Industrial	820	700	410	350
Transportation	430	390	344	312
Residential/Commercial	730	650	438	390
Non-Energy Uses	120	100	120	100
Total, without losses and consumption in energy sector	2,100	1,840	1,312	1,152

Based on data from *World Energy Outlook*, OECD/IEA, 1982, pp. 114, 118 (on the basis of the mean calorific value of oil used).

Over the last three years the energy situation in Western Europe has shaped under the strong influence of the economic crisis. The change of the cycle's present crisis stage by the economic activity upsurge will be accompanied by growing requirements for energy and increasing imports of energy materials.

This is practically inevitable, since problems of restructuring the energy balances in favour of coal and alternative sources of energy, and developing and extensively employing new energy-saving technologies and systems have proved to be much more difficult than conceived previously and they are still far from being solved.

Let us try to assess the dimensions of the energy requirements of the West European countries in 1990 and 2005 proceeding from the assumption that the decline in the energy-intensity of the GDP<sup>1</sup> by the countries of the region will be 10-15 per cent by 1990 and 15-20 per cent by 2005 (here the lower limit seems to be most realistic for 1990 and the upper limit—for 2005), while the rates of economic development in the 1981-1990 period will be 2.3-3.2 per cent, and in the 1991-2005 period, 2.6-3.8 per cent.

By 2005 the West European countries' total needs for fuel and energy resources may have reached 2,250-2,500 million t.c.e., or 40 to 60 per cent over and above the 1980 level.

From what sources will such an amount of energy be obtained?

The prospects of *nuclear energy* in Western Europe, except France, up to the year 2000 are estimated very low.

It is assumed that the installed capacity of the atomic

power stations in the region (with allowance for those under construction) will amount to 100 GW.

Production of energy on thermal reactors is now restricted because of the small stocks of uranium. But the limits to the growth of atomic power engineering imposed by uranium shortages can be overcome by employing breeders which produce 50 to 60 times more radioactive substance than they consume. These reactors, however, which are still in the initial stage of development, have already become the subject of heated debates all over the world. Their commercial application involves the production of large quantities of plutonium fuel, thus entailing the danger of its proliferation and use for military purposes.

Protection of people against radioactive contamination and disposal of nuclear reactor waste constitute another important aspect of atomic power engineering.

That is why the downward tendency observable in recent years in the list of orders for designing and building atomic power projects gives every reason to believe that by 2000-2005 their installed capacity in the West European countries will hardly have topped 150-200 GW. With a capacity loading close to 60 per cent and transformation efficiency equal to 35 per cent, this will correspond to an annual output of electric energy equivalent to 280-370 million t.c.e., or 12-15 per cent of the requisite quantity of primary energy resources.

Projects having to do with *alternative energy sources* are still in a too early stage to assess their technical maturity and economic potentialities. Although all countries believe renewable sources to be a fundamental component of their energy programmes, forecasts indicate that towards the end of the century their application for producing energy will be insignificant.

As for the further expansion of hydroelectric power engineering, this on the whole seems unlikely on the scale of the region.

It may be assumed that water-power resources and other renewable sources of energy by the year 2000 will be contributing to the energy balance 200-220 million t.c.e. or about 8-9 per cent of Western Europe's needs for primary energy resources.

Thus, around 80 per cent of the region's requirements for energy in the early 21st century should be covered by such mineral fuel as oil, gas and coal.

At present production of coal in the region amounts to

# West European Countries' Requirements for Energy (forecast)

(mln t.c.e.)

	1990		2005					
	Decline in energy-intensity of GDP, per cent							
	10		15		20			
	Economic growth rates, per cent							
	2.3	3.2	2.3	3.2	2.6	3.8		
Western Europe including: FRG France Great Britain Italy	1,559.3	1,760.9	1,663.1	1,815.5	2,200.2	2,859.4	1,955.9	2,541.6
	352.5	398.1	434.6	376.0	497.5	646.5	442.2	574.7
	233.7	264.0	288.2	249.3	329.8	428.6	293.2	381.0
	270.2	305.2	333.2	314.6	381.3	495.6	339.0	440.5
	189.3	213.8	233.4	220.4	267.2	347.2	237.5	308.6

Source for 1980: 1980 Yearbook of World Energy Statistics, UN, 1982

some 300 million tons a year; it is characterized by low growth rates and high costs. Despite their extensive plans the West European countries have failed to achieve an appreciable increase in the output of this energy source mainly because of the lag in developing the necessary infrastructure. Insofar as the coal industry has for many years been in a depression state, its revival and expansion will need enormous investments. That is why, given the most favourable conditions, one may expect coal production in the region to increase by not more than 20 per cent.

According to some forecasts, the import of coal into Western Europe may be double the home production. If, however, shipments of coal to the region on such a scale are technically possible, they are rather problematic in many other respects. To effect them the countries of the region will have to construct ports, railways, rolling-stock and coal-fuelled power plants, which will require much effort and means. That is why the highest level possible for the import of coal into Western Europe for fuel purposes in the year 2000 may be estimated at 225 million t.c.e.

At the same time the ecological characteristics of the use of coal in power engineering, its costly extraction, processing and transportation hold back and will continue to hold back its wider application. Despite all measures now being taken in Western Europe, its proportion in the consumption of fuel and energy resources dropped down to 22 per cent in 1982, while the total consumption of energy went up by 11.9 per cent during the 1973-1982 period.

In all probability the consumption of coal in the year 2000 will amount to 500 to 530 million tons of equivalent fuel, hardly more than 21 to 23 per cent of the energy balance.

Thus, the West European countries' requirements for oil and gas in the year 2000 will amount to 1,270-1,380 million t.c.e.

The proved oil reserves in the region, 3,131 million tons as of January 1, 1984, are insufficient to maintain the present production level (141.2 million tons in 1982).

The consumption of oil in the West European countries (in 1982 it made up 850 million t.c.e.) considerably exceeds its home production and that is why its imports have in recent years been at a level of 700 million t.c.e. a year. The bulk of its imports derives from the OPEC members (the Middle Eastern ones above all).

In this connection great importance is attached to the oil export policy which will be pursued by the OPEC

members, whose reserves of oil are sufficient to maintain a moderate production level at least for the next twenty years. Moreover, Western Europe's ability to retain its proportions in OPEC exports in the face of competition from other oil consumers, especially the USA and Japan, will also be of great importance.

According to existing forecasts, oil production in Western Europe in the year 2000 will make up 180 million t.c.e., while its oil consumption is estimated at 1,130-1,150 million t.c.e. This means that the region's requirements for oil will not tend to diminish.

In view of this a special role belongs to the problem of replacing oil by other types of energy sources. Technically, oil has no fully adequate substitutes, i.e., such other energy materials whose production and consumption could grow at the same rate as the production and consumption of oil since the early 1950s.

The use of coal has its obvious limits. The employment of solar and nuclear energies is limited to a still greater extent by virtue of their natural characteristics.

Natural gas is the only energy source capable of replacing oil on a large scale.

The production of natural gas in Western Europe rose from 20,000 million cubic metres in 1965 to 174,000 million cubic metres in 1982, a more than eightfold increase. The Netherlands, a major exporter of natural gas, in 1982 produced 71,400 million cubic metres; in the near future, however, a decline is expected in the extraction of gas because of the depletion of the Groningen gas-field, and now the country does not renew contracts for its export.

The proved reserves of natural gas in the region as of January 1, 1984, were 4,455,000 million cubic metres, of which 85.2 per cent belonged to three countries: Norway—37.4 per cent, the Netherlands—31.8 per cent and Great Britain—16 per cent.

In 1983 the proved gas reserves increased in Norway (by 22,000 million cubic metres) and Denmark (by 17,000 million cubic metres), while the total increase was a mere 0.4 per cent as compared with 1982; the greatest decline was observed in the Netherlands—by 53,000 million cubic metres.

According to the forecasts of the International Energy Agency, the maximum production of natural gas in the Netherlands in the year 2000 may, under most favourable conditions, reach only 25,000 million cubic metres.

*Great Britain* is in possession of appreciable natural gas reserves, but they are chiefly intended for home con-



sumption, meeting the total requirements by only 75 per cent.

Although on completion of the gas-collecting network in the British sector of the North Sea after 1985 it is planned to produce around 50,000 million cubic metres of the off-shore gas annually (the figure for 1982 was 36,100 million cubic metres), Great Britain continues to increase her gas imports from Norway. In 1982 they made up 10,800 million cubic metres or 17.4 per cent more than in 1979.

The prospects of natural gas production in *Norway* (24,400 million cubic metres in 1982) are mainly connected with the discovery of appreciable gas reserves in the Norwegian sector of the North Sea making it advisable to construct a gas-collecting system for delivering up to 25,000 million cubic metres of natural gas annually to continental Europe after 1986.

It should be borne in mind, however, that the maximum volumes of gas, which may be delivered to the continent, depend on the carrying capacity of the Ekofisk-Emden (FRG) submarine gas pipeline (22,000 million cubic metres a year).

As variants of additional deliveries of Norwegian gas to the continent one may consider its transportation via the Frigg-St. Fergus gas pipeline (14,000 million cubic metres a year) and the Ekofisk-Teeside oil pipeline, when rearranged for gas transportation (14,000 million cubic metres a year), to Great Britain and then, across the English Channel, to France, or from Karsto, the new gas pipeline system terminal in the Norwegian sector (after 1985-1986), to Sweden and then via the Danish network (after 1985) to the FRG. Thus, the maximum capacity for Norwegian gas transportation may theoretically be stated as 50,000 million cubic metres annually.

However, implementation of these variants of gas transportation to the continent through the British sector and the Danish network seems unlikely even in the long term, for it requires huge investments, on the one hand, and concurrence of energy strategies of all participants in the projects, on the other.

So, the maximum delivery of Norwegian gas to the continent should be assessed at 22,000 million cubic metres a year and this will only partially compensate for the reduction in gas production in the Netherlands.

According to available forecasts, home production of natural gas in Western Europe in the year 2000 may come to 150-220 million t.c.e.

Consequently, if the need for oil and gas comes to 1,270-1,380 million t.c.e. then, with allowance for home oil production, the need for gas in the countries of the region should amount to 320-410 million t.c.e.

Hence the import of natural gas, without taking account of intra-regional deliveries, will make up 170-190 million t.c.e., or 140,000-160,000 million cubic metres.

Apart from the Soviet Union, appreciable quantities of natural gas can be delivered to Western Europe from the countries of North Africa by pipeline and in the form of LPG.

What is more, the volume of possible LPG imports to the countries of the region in the year 2000 is estimated at 35,000-46,000 million cubic metres. The capacity of the Trans-Mediterranean gas pipeline Algeria-Italy now comes to 12,000 million cubic metres a year. It may be increased to 18,000-20,000 million cubic metres. A study is being made of the economic expediency of laying an Algeria-Spain submarine gas pipeline. But even if this project is implemented by the year 2000, its capacity will hardly top 15,000 million cubic metres a year.

So, the shortage of natural gas in the West European countries after the year 2000 may add up to at least 70,000-80,000 million cubic metres a year.

Assessing the prospects of Soviet natural gas exports to Western Europe, the Hamburg *Der Spiegel* magazine in its article<sup>2</sup> on the inventions concerning the "needlessness" and "unprofitableness" of additional Soviet gas shipments points out that now the West European countries "can postpone their extremely costly prospecting operations in the northern part of the Norwegian sector of the sea, as well as the construction of a gas pipeline. Moreover, they will not have to enter into a liquid gas deal, contributing huge sums to the project." Still more laconic was the statement made in this connection by the firm Ruhrgas AG. In the firm's opinion the terms of agreements with the USSR "are by far more advantageous for importers than, say, the agreements on natural gas from North Africa or the North Sea."

The export of Soviet natural gas to Western Europe began in 1968 when it came to Austria, then the FRG (1973), Italy and Finland (1974) and France (1976). Since early 1980 talks have been in progress with Austria, Belgium, Italy, the Netherlands, France, the FRG and Switzerland on the conclusion of trade and economic agreements on additional deliveries of around 40,000 million cubic metres of gas annually, through the Urengoi-

Uzhgorod main gas pipeline. At present agreements on shipments under this project of additional amounts of gas have been signed with the FRG, France, Austria, Italy, Switzerland and West Berlin.

The attempts of the American administration to foil the transaction reflected above all the USA's desire, in conditions of a recession, to overcome economic difficulties at the expense of its allies and consolidate its shaken position as the capitalist world's leader. At the 1981 meeting of the Seven in Ottawa President Reagan insisted that they refuse to sign the "gas-pipes" agreement, offering as a compensation for the loss of Soviet natural gas shipments of predominantly American coal and nuclear fuel, "aid" in expanding gas extraction in the North Sea, or conclusion of several international arrangements on the deliveries to the West European countries of LPG from Nigeria, Algeria, Cameroon and countries of the Near and Middle East.

It should be noted that the USA was a traditional supplier of coal to Western Europe. In view of high coal prices, however, a considerable number of West European enterprises switched to gas, thus causing a tangible decline in the profits of the US coal corporations. Moreover, under the impact of the growing ecological problem the West European countries in an effort to control air pollution are striving to reduce coal consumption in densely populated areas by increasing the proportion of relatively clean natural gas.

So, there are favourable prospects for the shipment of additional amounts of Soviet natural gas to the West European countries since 1984 under the new export project.

Statesmen and business circles of the West European countries cannot but see through the selfish plans of the American strategists who are trying to torpedo the energy bridge between East and West, prevent their cooperation and make Western Europe more dependent on the imperialist policy of the United States.

Equal international cooperation is not only the shortest way to the solution of global problems, including those relating to fuel and energy, but also a reliable path of materially supporting the detente process, this imperative necessity of our times.

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<sup>1</sup> Consumption of energy per unit GDP, kg coal equivalent/US\$.  
<sup>2</sup> Der Spiegel, No. 2, January 9, 1984, p. 76.

GENERAL

SOVIET-IRAQI POWER COOPERATION UPDATED

Moscow FOREIGN TRADE in English No 8, Aug 84 p 32

[Text]

The power industry occupies an important place in Soviet-Iraqi economic and technical cooperation. More than one-third of the technical assistance given to Iraq falls to the construction of power-generating projects.

During the years of cooperation Iraq, with Soviet technical assistance, has built the thermal power stations: Najibiya (200,000 kW) and Nasiriya (840,000 kW) and also the Dukan 400,000 kW hydro-electric station.

In 1983 these power stations generated about 7,000 million kWh of electricity, 47 per cent of the country's total output.

A dam (57 m high and about nine km long) is under construction for the hydro-power complex on the Euphrates river near the town of Hadithah.

Last March Baghdad was the venue of signing an intergovernmental agreement on furthering economic and technical cooperation. The agreement provides for the construction in Iraq, on a turn-key basis, of a 1.2 million kW thermal power station and also for rendering assistance in building the hydro-power complex on the Euphrates in the Baghdadi region. The complex includes a dam and a 300-400 MW hydro-electric station.

Ya. P. Ryabov, Chairman of the USSR State Committee for Foreign Economic Relations, and S. Yassin Khudeir, Iraqi Minister of Industry and Mineral Resources, signed the agreement.

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## GENERAL

### CAPITALIST ELECTRIC POWER MARKET VIEWED

Moscow FOREIGN TRADE in English No 8, Aug 84 pp 38-42

[Article by Vladislav Ratnikov, cand. sc. (econ.)]

[Text]

The Long-Term Energy Programme of the USSR is an important element of the wide complex of measures the Communist Party and the Soviet State are carrying out to ensure a steady rise in the living standards of the Soviet people and build up the might of the socialist community. The Programme defines the science-based principles, major trends and most important measures concerning the expansion of the country's energy base and the further qualitative improvement of its fuel-and-energy sector.

The following tasks have been set in the area of power engineering in the USSR for the coming 20 years:

- reduction in the proportion of residual fuel-oil and then of natural gas in the fuel balance of electric power stations by way of building predominantly atomic power stations, thermal power plants operating on cheap coals extracted by an open-cast method, and large hydroelectric power stations, chiefly in the eastern areas of the country;

- completion of the country's Integrated Electric Power System with an increase in its manoeuvrability and reliability by constructing peak power stations and super high voltage a.c. and d.c. power transmission lines, and by improving the quality of electric energy supplied to the consumer;

- further development of the combined production of electric and heat energy.<sup>1</sup>

The main specific feature of the USSR's fuel-and-energy complex is that its long-term development is fully guaranteed by the country's own resources. For instance, the total deposits of coal alone in the USSR are estimated at approximately  $(5.5-6) \cdot 10^{12}$  tons and account for about half of the world's reserves.<sup>2</sup>

In 1983 the Soviet Union produced 1,416,000 million kWh of electricity (2nd place in the world), while the extraction of organic fuels reached: oil, including gas condensate—616 million tons (1st place in the world), gas—536,000 million cubic metres (1st place in the world), coal—716 million tons (second place in the world).<sup>3</sup>

Under the Energy Programme, appreciable sums (40,800 million rubles) have been allocated for the development of the USSR's fuel-and-energy complex.<sup>4</sup>

The Integrated Electric Power System (IEPS) of the country operates over a territory of more than 10 million square kilometres serving a population of around 220 million. In the coming years the power grids of Central Asia and the Far East will be connected to it. Provision is made for the completion of a ramified circular system of 750 kV high-voltage lines which will link large atomic power stations with the major electricity-consuming regions and strengthen the connection between the USSR's IEPS and the power grids of the European CMEA members.

For the first time in the world, unique super-high voltage power transmission lines (1,150 kV a.c. and 1,500 kV d.c.) for industrial purposes are being constructed in the USSR to transmit electric energy from Kazakhstan and Siberia to the Urals and the Centre of the USSR.

All this will appreciably enhance the role of the Soviet Union on the international electricity market, a most dynamic sector of the world economy. The world generation of electricity rose from 6,331,000 million kWh in 1975 to 8,227,000 million kWh in 1983 (by 29.9 per cent), whereas the extraction of oil over the same period increased 1.9 per cent, natural gas—20.8 per cent, coal—51.4 per cent.<sup>5</sup>

A high degree of production concentration is a distinctive feature of the capitalist electricity market. The seven leading capitalist states: the USA, Japan, the FRG, Great Britain, Canada, France and Italy, account for over 80 per cent of the total production of electric energy in the developed capitalist countries.

Efficient production and consumption of electric energy presupposes the availability of energy resources in a country (coal, residual fuel oil, gas, waterpower resources, nuclear raw materials, and so on), a network of power stations, power transmission lines, a distribution network, an appreciably developed industry, as well as skilled manpower. Analysis of the market shows that the industrial capitalist countries, the leading producers and consumers of electricity, having set up a large technical base for electricity supplies and general energy consumption, have failed to

provide it with fuel. In the 1970s this caused a steep increase in the dependence of the major capitalist electric energy producers on the import of energy resources. Between 1971 and 1980, for instance, the proportion of fuel in the total value of imports increased: in the EEC countries—twofold, in Japan—2.4-fold, in the USA—more than 4.8-fold.

The growing dependence of the major electricity producers on fuel imports is explained by their lack of sufficient stocks of such types of fuel as oil and natural gas on which the energy economy of industrial capitalist countries was oriented before the exacerbation of the energy crisis (i.e., prior to 1973-1974). And although in the latter half of the 1970s most of these countries adopted programmes for restructuring their energy economy, in 1979 and 1980 the industrial capitalist countries experienced serious difficulties in supplying fuel for their thermal power plants, whose share in the total consumption of energy resources is constantly increasing. According to specialists in the US Energy Department, the proportion of fuel in the country's imports will by 1985 increase (in terms of value) up to 36 per cent, and by the year 2000—up to 42 per cent.

In the period when the problem of organic fuel supply has become acute there is a tendency to expand the construction of atomic power stations and coal-fuelled thermal power plants. In the long term up to the year 2000 this tendency will remain owing to the adoption in most capitalist countries of long-term programmes for switching power engineering back to coal and nuclear raw materials instead of residual fuel oil and natural gas.

In view of the high capital-intensity and great inertia of the fuel-and-energy complex and also the high level of intra-sectoral competition, one may conclude that the process of restructuring the technical base of the world power industry will take at least 20 to 30 years.

In the long term the requirements of the principal consuming sectors for fuel and energy will continue to grow; moreover, compared with fuel-and-energy materials the demand for electricity will be increasing more rapidly.

The specifics of the scientific and technological revolution now in progress lie in the demand for an ever higher level of electrification as a most important factor for raising the productivity of labour and output quality. Industry continues to be the major consumer of electric energy; its share in the total consumption of electric energy in 1980 was 49 per cent in the EEC countries and 52 per cent in the USA. Consumption of electricity by other sectors in the economy is much lower than in industry. For instance, the domestic

sector, which ranks second in the volume of electricity consumption, uses approximately half as much electric energy as industry, and the transport 6 to 7 times less. The existing proportion of electric energy consumption between the main consuming sectors will perhaps remain so in the future.

The growth of electricity production and consumption is accompanied by intensive development of the electrical network, an increase in the length of power transmission lines and capacity of power substations.

Over the 80 years of the development of high-voltage networks success has been achieved in transmitting alternating-current voltages of 10 to 750 kV and more and a direct-current voltage of 800 kV; the carrying capacity of one circuit of a line has been increased more than 1,000 times. The development of the modern power industry is characterized by the setting up of power systems and their integration.

Today while building and operating power units with an installed capacity of 0.5-1 million kW the advantages of integrated power systems have given rise to the tendency to employ 330-345, 380-400, 500 kV and more power transmission lines making it possible to distribute electric energy from large power stations, transmit it over long distances, and activate system-forming functions able to perform the requisite power shifts between regional power grids.

Construction of large power stations and inter-regional transmission lines has led to the formation of an international electric energy market, which began late in the 1930s, when the power systems of Austria and Switzerland were connected to those of Germany, France and Italy with the aim of utilizing surplus electric energy generated by hydro-electric power stations sited in the Alps.

The next stage in the formation of the international electricity market in Western Europe was the setting up in the mid-1950s of four integrated power grids: the FRG, France and Switzerland; Italy, France and Switzerland; Belgium, the FRG and Holland; Austria and the FRG.

In 1983 Western Europe had over 80 power transmission lines connecting the power systems of nearly all West European countries. The West European national power systems are connected into a single 220-330 kV and 275-380 kV alternating-current network.

In future it is planned to expand the national power systems and set up a 400 kV integrated power system in the West European countries. Calculations by specialists from the UN Economic Commission for Europe show that this



system, when established, will in 1985 reduce the total demand for electricity in the region by approximately 9 per cent as compared with the prognosticated consumption level for each country separately.<sup>6</sup>

The power systems of the USA and Canada are connected by nine 230 kV power transmission lines. Moreover, work is also in progress on the construction of d.c. high-voltage transmission lines between the State of Minnesota (USA) and the province of Manitoba (Canada). The USA and Mexico are connected by two 138 kV transmission lines.

The industrial capitalist countries are the principal importers and exporters of electric energy: in 1982 fifteen of them took some 98 per cent of the total capitalist imports of this commodity, of which 80 per cent was accounted for by the USA, the FRG, France, Switzerland, Belgium, Italy and Denmark. This was due to the specificity of electric energy as a commodity, which cannot be stored and which should be delivered to consumers over the shortest distances. The integrated power systems of these countries help power consumption to be regulated and each country's needs supplied at a definite time.

Below we cite the basic data on the electricity market of the EEC countries which by the beginning of 1980 accounted for over 85 per cent of the total consumption of electric energy in Western Europe.

	Electric Energy ('000 mln kWh)			
	Production	Consumption	Imports	Exports
1960	430.0	434.3	9.1	4.9
1969	804.4	810.2	23.0	17.2
1979	1,178.9	1,195.6	58.6	41.9
1980	1,186.6	1,201.8	58.1	42.9
1981	1,206.0	1,217.2	65.4	43.6
1982	1,202.0	1,211.6	59.1	39.7
1983*	1,227.0	1,236.2	71.7	44.5

\* Tentative data.

Sources: *Elektrizität*, November 1980, March 1981, January 1984; *World Energy Supplies*, UN, New York, 1961-1981.

The quantity of electricity supplied for export by the EEC countries in 1980 made up a mere 3.6 per cent of its total output, which was much below the proportion of fuel-and-energy materials in foreign trade transactions. It should be noted at the time that over a period of 20 years (1961-1980) the absolute volumes of electricity supplies by the EEC countries rose more than 8.7-fold. By 1990 electric energy exports by the EEC countries are expected to increase by

approximately 50 per cent to 55,000-60,000 million kWh. The leading electricity exporters in Western Europe will continue to be Switzerland (according to estimates, 3,500 million kWh in 1990) and Belgium (1,800 million kWh), while the importers will include the FRG (net imports are forecast at around 7,000-11,000 million kWh), Finland (over 4,000 million kWh) and Austria (about 1,000 million kWh).<sup>7</sup>

For all the contradictory nature of the forecasts as concerns the quantitative indicators, they contain some general conclusion to the effect that the long-term demand for electricity will grow much faster than that for oil, gas and even coal. In the foreseeable future, however, the power industry as part of the fuel-and-energy complex will meet economic and financial difficulties due to the need for large investments to re-equip and expand the technical base of the complex, develop power installations and distribution networks, and the like.

According to estimates, however, the requisite investments for the development of inter-regional power transmission lines will not only be recouped by electric energy sales on foreign markets but will also save the means which would be needed for setting up the necessary reserve power station capacities.

Electric energy is a special type of commodity which at the present level of technical development cannot be transmitted as yet over long distances without substantial losses. This circumstance markedly narrows the limits of foreign trade in electric energy, whose exchange is developing regionally, more often between neighbouring countries and groups of states. And although there is the territorial proximity of the consumer to the producer of electric energy, on the electricity market, as on no other market, it is difficult to compare internal prices as they differ quite considerably.

The main reasons for these price discrepancies lie in the national specifics of the development of the energy base, different exchange rates, distinctions between the principles of price formation, the structural differences in the sector, the different level of import duties on individual types of energy materials.

Government subsidies to electricity consumers and producers also exert a definite influence on the level of electric energy prices. In the opinion of specialists from the British Ministry of Fuel and Power, for instance, government subsidies to electricity consumers and producers in France and the FRG have created conditions in which the French and West German engineering firms in 1980 paid nearly 25 per cent less per electricity unit than such firms in Great

Britain.<sup>8</sup> Indeed, if we take the level of the averaged price of electricity for the industrial consumers in France in 1980 as 100, then this indicator in the FRG will be 111.7, in Great Britain—147, in the Netherlands—156, in Italy—186.<sup>9</sup>

Among the numerous factors determining the price levels of electricity in the capitalist countries, mention should, in our opinion, be made of the following:

- the type of power installation (steam-, gas-, water-turbine-, diesel-powered, etc.) and its capacity;

- the type of fuel-and-energy resource used (organic fuel, nuclear raw material, wind power, water power, solar energy, etc);

- the form of property of a power plant (state-owned, private, cooperative);

- time of electric energy consumption and production.

The type of power plant is a most important factor determining the correlation between the main components of electricity generation costs. Owing to their high construction costs, atomic power stations, for instance, are characterized by the great relative weight of the constant component of energy production costs and, on the contrary, by the relatively low cost of fuel as compared with thermal power plants. The relative weight of the fuel component of the cost of electricity generated by an atomic power station ranges in different countries between 15 and 30 per cent (uranium accounts for approximately 45 per cent of the total expenses on the nuclear fuel cycle), whereas this figure for oil- or coal-fired thermal power plants is equal to 55-75 per cent.

The level of electric energy prices depends on a large number of factors producing opposite effects on their movement. As a result, electricity prices are highly dynamic, they have a complex structure due to numerous reservations and all sorts of provisions, increased dependence on the policies of electric power-producing monopolies which are always in a state of cut-throat competition not only between themselves but with monopolies in other sectors, considerable susceptibility to the influence of scientific and technical progress, the growing effects of inflationary factors.

According to the foreign trade statistics of several industrial capitalist countries, between 1970 and 1980 export prices on electric energy rose by an average approximate factor of 2.5 to 2.9.

The level of foreign trade prices on electricity is influenced by production conditions, the time of the day and the year, the amount of electric energy supplied for foreign markets, and so on. Intended for export is primarily electric energy generated by hydro-electric power stations and

atomic power plants, where its production costs are much lower than in the case of thermal power plants. For instance, payment for electricity in West European countries in the period of peak load is effected with a coefficient of 2-2.5 as compared with payment for electric energy supplied in night hours.

Contracts for electricity supplies show the minimum guaranteed volume of export deliveries, which is tied up with the price for the power capacity placed by the exporter at the disposal of the importer during the day, as well as the time during which low and high rates are in force.

Among the principal indicators on which the level of foreign trade prices on electricity depends are production costs at the particular power station supplying electric energy for export, and also the average electricity and fuel price levels existing in a given region. Their contribution to the general contract supply price in the West European countries in the early 1980s amounted to 60-80 per cent.

To determine the price of electricity supplied for export specialists in capitalist countries use approximate calculation methods by which they tie up the most important elements of both the components and the overall production costs of electric energy and its delivery to the importer. This way of estimating the foreign trade price level requires authentic information about similar power projects operated in other countries, as well as data on the application of scientific and technical achievements in constructing and running electric power stations and power systems.

In the long term fuel price increases the growing cost of power stations, their operation and repair, the increasingly rigid demands as regards environmental protection and power plant operating safety, and the high rates of inflation will tend to retain the upward tendency in the production costs and prices of electric energy in capitalist countries. At the same time, already in the second half of the 1980s scientific and technical progress will increasingly influence the cost of power generation, transmission and consumption, thus leading to a decline in the growth rates of electric energy production costs as compared with the similar indicators of the mid-1970s.

Solution of the problems of effective utilization of fuel, which became particularly acute during the exacerbation of the energy crisis, still lags far behind the possibilities of the present level of technology. In 1976-1980, for instance, the world losses of energy materials in the process of electricity generation were within the limits of 65-70 per cent, which was the result of the low efficiency of power installations (30-35 per cent), and the important point is that the present

methods of electricity generation have practically exhausted the reserves for raising the efficiency of thermal power plants. In 1960-1970 the consumption of fuel per 1 kWh of electricity produced by thermal power stations in the EEC countries dropped by 10 to 16 per cent, whereas in 1970-1980 this decline was a mere 2 to 4 per cent.

Soviet scientists consider that even today's engineering knowledge makes it possible to raise the efficiency of power stations up to 55 to 60 per cent, and in producing 1 kWh of electricity it is possible to save one-third of fuel and reduce the amount of heat discharged into the atmosphere by 30 to 40 per cent.<sup>10</sup> This way to resolve the problem is by perfecting the methods of electric energy production, utilizing gas turbines instead of the commonly used steam turbines, and so on. Without going into technical details and possible solutions, we shall only note that already now one thing is quite clear: in the not so distant future, at the stage of processing primary energy materials, a qualitatively new techno-economic leap is possible, which may substantially change our idea of the level of electric energy production costs.

A reduction in the loss of electric energy during its transmission may in the long term become an important factor in raising the efficiency of the power industry, cutting investments and lowering production costs. According to our estimates, in 1976-1980 the USA lost up to 10 per cent of electricity generated by electric power stations in its power transmission lines.

It is impossible so far to fully stop these losses owing to the operation of physical laws, such as conductor resistance. An appreciable reduction in losses, however, is possible when building high-voltage power transmission lines and direct-current lines, which in turn lowers the overall cost of electric energy transportation, by concentrating electrical networks, and reducing the right-of-way. An increase in the voltage of a power transmission from 400 kV to 750 kV lowers the electricity losses in it by 30-40 per cent. Moreover, a certain lowering of the present level of losses may be achieved by rationalizing the energy flows, and by using ever more perfect equipment — transformers made out of improved grades of steel, devices for regulating energized transformers, and so on. The building of superconductive power transmission lines offers great economic advantages too.

As noted above, electric energy has a tangible specific drawback—there are no methods for storing it. This is a serious obstacle to the quick satisfaction of the changing requirements for electricity, which considerably outstrip its

centralized production, since during the 8,760 hours that make up the calendar year the level of electric energy consumption during one winter day fluctuates within the limits of 30 per cent, while the difference between the peak loads on winter and summer days may reach 80 per cent. One of the possible ways of solving this problem lies in wider use of the so-called compensatory transportation of electric energy instead of its direct transportation between the zones of its production and consumption.

Scientific and technical progress in the generation of electricity and its transmission over great distances, enlargement of national power systems and their integration with the power grids of neighbouring countries, the higher price levels for primary energy materials (above all residual fuel oil and natural gas) as compared with the early 1970s, the specificity of electric energy as ecologically the cleanest type of energy, warrant the conclusion that in the long term there are objective conditions for an appreciable expansion of the international market for this commodity, on which electricity exports from the Soviet Union will occupy an increasingly prominent place.

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<sup>1</sup> The Basic Provisions of the Long-term Energy Programme of the USSR, Politizdat, Moscow, 1984, p. 12 (in Russian).

<sup>2</sup> *Atomnaya energiya*, 1983, Vol. 54, Issue 4, p. 243.

<sup>3</sup> *Pravda*, January 29, 1984.

<sup>4</sup> *Ekonomicheskaya gazeta*, No. 13, March 1984.

<sup>5</sup> Calculated on the basis of the *Monthly Bulletin of Statistics*, UN, New York, December 1980, 1983, p. xii.

<sup>6</sup> *The 11th World Energy Conference*, 1980, Vol. W.G., p. 497.

<sup>7</sup> *Ibid.*, p. 498.

<sup>8</sup> *European Chemical News*, March 16, 1981, p. 17.

<sup>9</sup> In view of this Britain favours changing over to price formation within the EEC on the basis of real expenses per unit of electricity.

<sup>10</sup> *Pravda*, August 7, 1979.

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GENERAL

EDITORIAL REPRIMANDS FUEL-ENERGY COMPLEX

Moscow SOVETSKAYA ROSSIYA in Russian 23 Oct 84 p 1

[Editorial: "End The Year With A Bang"]

[Excerpt] The fuel-energy complex is a subject of considerable concern. The smooth running of the entire economy during the fall-winter season depends on its reliability. In this connection the fuel-energy branch may not be said to be carrying out its responsibilities satisfactorily. Minenergo must become more efficient in repairing boilers and turbines, in providing the fuel reserves necessary to electric power stations, in taking the most active steps to introduce new electric power facilities, above all into rayons in the Urals, Siberia and the Far East. A problem which is no less important and just as urgent is the improvement of operations in the petroleum industries of West Siberia and Komi ASSR. Minnefteprom has more than once been critical of laggardness in the primary oil production associations. Each time personnel in the branch plead that the plans developed by their enterprise will set things right. However, assurances are no excuse in practice. Minugleprom SSSR is exceeding the same administrative chessboard time limit. Almost half the production associations did not fulfill their production plans owing to operational delays. Interruptions during mining of the Kuznetsk deposit have become chronic. After all, industrial enterprises find its production particularly valuable! Minnefteprom and Minugleprom must conscientiously and in organized fashion analyze the reasons for these delays and find and carry out measures for the unconditional fulfilment of the year's plans and obligations.

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